### CPC  COOPERATIVE PATENT CLASSIFICATION

#### H  ELECTRICITY

*(NOTE omitted)*

#### H01  BASIC ELECTRIC ELEMENTS

*(NOTE omitted)*

#### H01J  ELECTRIC DISCHARGE TUBES OR DISCHARGE LAMPS

(spark-gaps H01T; arc lamps with consumable electrodes H05B; particle accelerators H05H)

**NOTES**

1. This subclass covers only devices for producing, influencing, or using a flow of electrons or ions, e.g. for controlling, indicating, or switching of electric current, counting electric pulses, producing light or other electromagnetic oscillations, such as X-rays, or for separating or analysing radiation or particles, and having a closed or substantially closed casing containing a chosen gas, vapour, or vacuum, upon the pressure and nature of which the characteristics of the device depend. Light sources using a combination (other than covered by group H01J 61/96 of this subclass) of discharge and other kinds of light generation are dealt with in H05B 35/00.

2. In this subclass, groups H01J 1/00 - H01J 7/00 relate only to:
   i. details of an unspecified kind of discharge tube or lamp, or
   ii. details mentioned in a specification as applicable to two or more kinds of tubes or lamps as defined by groups H01J 11/00, H01J 13/00, H01J 15/00, H01J 17/00, H01J 21/00, H01J 25/00, H01J 27/00, H01J 31/00, H01J 33/00, H01J 35/00, H01J 37/00, H01J 40/00, H01J 41/00, H01J 47/00, H01J 49/00, H01J 61/00, H01J 63/00 or H01J 65/00, hereinafter called basic kinds. A detail only described with reference to, or clearly only applicable to, tubes or lamps of a single basic kind is classified in the detail group appropriate to tubes or lamps of that basic kind, e.g. H01J 17/04.

3. In this subclass, the following term is used with the meaning indicated:
   *“lamp” includes tubes emitting ultra-violet or infra-red light.*

4. Attention is drawn to the definition of the expression “spark gaps” given in the Note following the title of subclass H01T.

5. Apparatus or processes specially adapted for the manufacture of electric discharge tubes, discharge lamps, or parts thereof are classified in group H01J 9/00.

**WARNING**

In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.

| Details of electrodes, of magnetic control means, of screens, or of the mounting or spacing thereof, common to two or more basic types of discharge tubes or lamps (details of electron-optical arrangements or of ion traps) | 1/00
| --- | ---
| Main electrodes | 1/02
| [Hollow cathodes] | 1/025
| Liquid electrodes, e.g. liquid cathode | 1/04
| characterised by material | 1/05
| Containers for liquid-pool electrodes; Arrangement or mounting thereof | 1/06
| Positioning or moving the cathode spot on the surface of a liquid-pool cathode | 1/08
| Cooling, heating, circulating, filtering, or controlling level of liquid in a liquid-pool electrode | 1/10
| Cathodes having mercury or liquid alkali metal deposited on the cathode surface during operation of the tube | 1/12
| Solid thermonic cathodes | 1/13
| [Circuit arrangements therefor, e.g. for temperature control] | 1/135
| characterised by the material | 1/14
| with alkaline-earth metal oxides, or such oxides used in conjunction with reducing agents, as an emissive material | 1/142
| with other metal oxides as an emissive material | 1/144
| with metals or alloys as an emissive material | 1/146
| with compounds having metallic conductive properties, e.g. lanthanum boride, as an emissive material | 1/148
| Cathodes heated directly by an electric current | 1/15
| characterised by the shape | 1/16
| Supports; Vibration-damping arrangements | 1/18
| Cathodes heated indirectly by an electric current; Cathodes heated by electron or ion bombardment | 1/20
| Heaters (filaments for incandescent lamps) | 1/22
| Insulating layer or body located between heater and emissive material | 1/24
| Supports for the emissive material | 1/26
| Dispenser-type cathodes, e.g. L-cathode | 1/28
| Cold cathodes, e.g. field-emissive cathode | 1/30
| Field-emissive cathodes | 1/304
| [microengineered, e.g. Spindt-type] | 1/3042
| [Point emitters] | 1/3044
| [Edge emitters] | 1/3046
| [Distributed particle emitters] | 1/3048
1/308 . . . Semiconductor cathodes, e.g. cathodes with PN junction layers
1/312 . . . having an electric field perpendicular to the surface, e.g. tunnel-effect cathodes of Metal-Insulator-Metal [MIM] type \{(H01J 1/304 - H01J 1/308 take precedence)\}
1/316 . . . having an electric field parallel to the surface, e.g. thin film cathodes
1/32 . . . Secondary-electron-emitting electrodes \{(H01J 1/35 takes precedence; luminescent screens H01J 1/62; charge storage screens in general H01J 1/78; charge storage screens using secondary emission for image tubes H01J 29/41; dynodes for secondary emission tubes H01J 43/10; secondary-emission detectors for measurement of nuclear or X-radiation G01T 1/28)\}
1/34 . . . Photo-emissive cathodes \{(H01J 1/35 takes precedence; photoelectric screens H01J 1/78)\}
1/35 . . . Electrodes exhibiting both secondary emission and photo-emission
1/36 . . . Solid anodes; Solid auxiliary anodes for maintaining a discharge
1/38 . . . characterised by the material
1/40 . . . forming part of the envelope of the tube or lamp
1/42 . . . Cooling of anodes \{(cooling rotary anodes H01J 1/44); Heating of anodes\}
1/44 . . . Rotary anodes; Arrangements for rotating anodes; Cooling rotary anodes
1/46 . . . Control electrodes, e.g. grid \{(for igniting arrangements H01J 7/30); Auxiliary electrodes \{(auxiliary anodes for maintaining a discharge H01J 1/36)\}\}
1/48 . . . characterised by the material
1/50 . . . Magnetic means for controlling the discharge
1/52 . . . Screens for shielding \{(screens acting as control electrodes H01J 1/46); Guides for influencing the discharge; Masks interposed in the electron stream\}
1/53 . . . Electrodes intimately associated with a screen on or from which an image or pattern is formed, picked up, converted, or stored \{(see provisionally also H01J 29/08 - H01J 29/36)\}
1/54 . . . Screens on or from which an image or pattern is formed, picked up, converted, or stored; Luminescent coatings on vessels \{(see provisionally also H01J 29/08 - H01J 29/36)\}
1/56 . . . acting as light valves by shutter operation, e.g. for eidophor \{(see provisionally also H01J 29/08 - H01J 29/36)\}
1/58 . . . acting by discolouration, e.g. halide screen \{(see provisionally also H01J 29/08 - H01J 29/36)\}
1/60 . . . Incandescent screens \{(see provisionally also H01J 29/08 - H01J 29/36)\}
1/62 . . . Luminescent screens; Selection of materials for luminescent coatings on vessels \{(see provisionally also H01J 29/08 - H01J 29/36)\}
1/63 . . . characterised by the luminescent material \{(luminescent materials or compositions C09K 11/00 \{(see provisionally also H01J 29/08 - H01J 29/36)\)\}\}
1/64 . . . characterised by the binder or adhesive for securing the luminescent material to its supports \{(see provisionally also H01J 29/08 - H01J 29/36)\}
1/66 . . . Supports for luminescent material \{(vessels H01J 5/02 \{(see provisionally also H01J 29/08 - H01J 29/36)\)\}\}
1/68 . . . with superimposed luminescent layers \{(see provisionally also H01J 29/08 - H01J 29/36)\}
1/70 . . . with protective, conductive, or reflective layers \{(see provisionally also H01J 29/08 - H01J 29/36)\}
1/72 . . . with luminescent material discontinuously arranged, e.g. in dots or lines \{(see provisionally also H01J 29/08 - H01J 29/36)\}
1/74 . . . with adjacent dots or lines of different luminescent material \{(see provisionally also H01J 29/08 - H01J 29/36)\}
1/76 . . . provided with permanent marks or references \{(see provisionally also H01J 29/08 - H01J 29/36)\}
1/78 . . . Photoelectric screens; Charge-storage screens \{(see provisionally also H01J 29/08 - H01J 29/36)\}
1/88 . . . Mounting, supporting, spacing, or insulating of electrodes or of electrode assemblies
1/90 . . . Insulation between electrodes or supports within the vacuum space \{(leading-in conductors H01J 5/46)\}
1/92 . . . Mountings for the electrode assembly as a whole
1/94 . . . Mountings for individual electrodes \{(for directly-heated cathodes H01J 1/15)\}
1/96 . . . Spacing members extending to the envelope
1/98 . . . without fixed connection between spacing member and envelope
3/00 Details of electron-optical or ion-optical arrangements or of ion traps common to two or more basic types of discharge tubes or lamps
3/02 . . . Electron guns \{(electron guns for discharge tubes with provision for introducing objects or material to be exposed to the discharge H01J 37/06; for cathode ray tubes H01J 29/48)\}
3/021 . . . \{(Electron guns using a field emission, photo emission, or secondary emission electron source)\}
3/022 . . . \{(with microengineered cathode, e.g. Spindt-type)\}
3/023 . . . \{(Electron guns using electron multiplication)\}
3/024 . . . \{(Electron guns using thermionic emission of cathode heated by electron or ion bombardment or by irradiation by other energetic beams, e.g. by laser)\}
3/025 . . . \{(Electron guns using a discharge in a gas or a vapour as electron source (gas-filled discharge tubes with gaseous cathodes H01J 15/00)\}
3/026 . . . \{(Eliminating deleterious effects due to thermal effects, electric or magnetic field \{(H01J 30/21 - H01J 30/25 take precedence)\)\)\}
3/027 . . . \{(Construction of the gun or parts thereof \{(H01J 30/21 - H01J 30/25; H01J 30/26 and H01J 30/28 take precedence)\)\)\}
3/028 . . . \{(Replacing parts of the gun; Relative adjustment \{(H01J 30/21 - H01J 30/25 take precedence)\)\)\}
3/029 . . . \{(Schematic arrangements for beam forming)\}
3/04 . . . Ion guns \{(see provisionally also H01J 27/80)\}
3/06 . . . two or more guns being arranged in a single vacuum space, e.g. for plural-ray tubes \{(H01J 30/7 takes precedence \{(see provisionally also H01J 29/46 - H01J 29/84)\)\)\}

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Details relating to vessels or to leading-in conductors common to two or more basic types of discharge tubes or lamps

Vessels; Containers; Shields associated therewith; Vacuum locks
Lamps

Recovery of material from discharge tubes or metal B21 parts thereof

Manufacture, installation, removal, maintenance of electric discharge tubes, discharge lamps, or parts thereof (manufacture of vessels or containers from metal B21, e.g. B21D 51/00, from glass C03B);

Recovery of material from discharge tubes or lamps

Apparatus or processes specially adapted for the manufacture, installation, removal, maintenance of electric discharge tubes, discharge lamps, or parts thereof (manufacture of vessels or containers from metal B21, e.g. B21D 51/00, from glass C03B);

Manufacture of heaters for indirectly-heated cathodes

Machines therefor

of photo-emissive cathodes; of secondary-emission electrodes

of secondary emission electrodes

of non-emitting electrodes

of shadow emission electrodes

of mask-treatment related to the process of dot deposition during manufacture of luminescent screen

Surface treatment, e.g. blackening, coating (H01J 9/144 takes precedence)

of electron emission flat panels, e.g. gate electrodes, focusing electrodes or anode electrodes

Machines for making grid wires

Assembling together the component parts of electrode systems

of flat panel display devices, e.g. by using spacers

Manufacture of screens on or from which an image or pattern is formed, picked up, converted or stored; Applying coatings to the vessel

Applying optical coatings or shielding coatings to the vessel of flat panel displays, e.g. applying filter layers, electromagnetic interference shielding layers, anti-reflection coatings or anti-glare coatings

Applying luminous coatings

[continuous layers]

[constituted by coated granules emitting light of different colour]

[by uniformly dispersing of liquid]

[by precipitation]

[by electrostatic or electrophoretic processes]

with luminous material discontinuously arranged, e.g. in dots or lines

by photographic processes (final treatment of shadow-mask prior to or after dot deposition H01J 9/144)

Devices for carrying out the processes, e.g. light houses

Auxiliary lenses and filters

Light sources particularly adapted therefor

including the exposition of a substance responsive to a particular radiation

Development of latent electrostatic images (per se G03G 15/06)

by other processes, e.g. serigraphy, decalcomania

Application of light absorbing material, e.g. between the luminescent areas

Manufacture of photoelectric screens or charge-storage screens

Manufacture of magnetic deflecting devices for cathode-ray tubes (manufacturing coils for transformers, inductances, reactors or choke coils H01F 41/04)

Manufacture or joining of vessels, leading-in conductors or bases
1. When classifying in this group, classification is made in all appropriate places.

2. In this group, the following term is used with the meaning indicated:
   - "main electrode" means any of a sustain electrode, scan electrode or address electrode.

11/00 Gas-filled discharge tubes with alternating current induction of the discharge, e.g. AC-PDPs
   [Alternating Current Plasma Display Panels]
   (circuits or methods for driving PDPs G09G 3/28);
   Gas-filled discharge tubes without any main electrode inside the vessel; Gas-filled discharge tubes with at least one main electrode outside the vessel (discharge lamps H01J 65/00) (H01J 61/00, H01J 63/00)

NOTES
1. When classifying in this group, classification is made in all appropriate places.
having mercury or liquid alkali metal deposited on the cathode surface during operation of the tube

17/10 . . . . Anodes
17/12 . . . . Control electrodes
17/14 . . . . Magnetic means for controlling the discharge
17/16 . . . . Vessels; Containers
17/18 . . . . Seals between parts of vessels; Seals for leading-in conductors; Leading-in conductors
17/183 . . . . [Seals between parts of vessel]
17/186 . . . . [Seals between leading-in conductors and vessel]
17/20 . . . . Selection of substances for gas fillings; Specified operating pressures or temperature (radioactive fillings H01J 17/32)
17/22 . . . . Means for obtaining or maintaining the desired pressure within the tube
17/24 . . . . Means for absorbing or adsorbing gas, e.g. by gettering
17/26 . . . . Means for producing, introducing, or replenishing gas or vapour during operation of the tube
17/28 . . . . Cooling arrangements
17/30 . . . . Igniting arrangements
17/32 . . . . Igniting by associated radioactive materials or fillings
17/325 . . . . [Current stabilising tubes, e.g. curpistros]
17/34 . . . . One or more circuit elements structurally associated with the tube
17/36 . . . . Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for
17/38 . . . . Cold-cathode tubes (TR boxes H01J 17/64)
17/40 . . . . with one cathode and one anode, e.g. glow tubes, tuning-indicator glow tubes, voltage-stabiliser tubes, voltage-indicator tubes, (cathode-glow lamps H01J 61/04)
17/42 . . . . having one or more probe electrodes, e.g. for potential dividing
17/44 . . . . having one or more control electrodes
17/46 . . . . for preventing and then permitting ignition but thereafter having no control
17/48 . . . . with more than one cathode or anode, e.g. sequence-discharge tube, counting tube, dekatron
17/485 . . . . [Plasma addressed liquid crystal displays [PACL]]
17/49 . . . . Display panels, e.g. with crossed electrodes [e.g. making use of direct current] (gas discharge type indicating arrangements effected by the combination of a number of individual lamps -G09F 9/313 (display panels making use of alternating current H01J 11/00])
17/491 . . . . [with electrodes arranged side by side and substantially in the same plane, e.g. for displaying alphanumeric characters]
17/492 . . . . [with crossed electrodes]
17/494 . . . . [using sequential transfer of the discharges, e.g. from the self-scan type
17/495 . . . . [display panels using sequential transfer of the discharge along dielectric storage elements]
17/497 . . . . [for several colours]
19/00 Details of vacuum tubes of the types covered by group H01J 21/00

19/02 Electron-emitting electrodes; Cathodes
19/04 Thermonic cathodes
19/06 characterised by the material
19/062 with alkaline-earth metal oxides, or such oxides used in conjunction with reducing agents, as an emissive material
19/064 with other metal oxides as an emissive material
19/066 with metals or alloys as an emissive material
19/068 with compounds having metallic conductive properties, e.g. lanthanum boride, as an emissive material
19/08 Cathodes heated directly by an electric current
19/10 characterised by the shape
19/12 Supports; Vibration-damping arrangements
19/14 Cathodes heated indirectly by an electric current; Cathodes heated by electron or ion bombardment
19/16 Heaters (filaments for incandescent lamps H01K 1/02)
19/18 Insulating layer or body located between heater and emissive material
19/20 Supports for the emissive material
19/22 Dispenser-type cathodes, e.g. L-cathode
19/24 Cold cathodes, e.g. field-emissive cathode
19/28 Non-electron-emitting electrodes; Screens
19/30 characterised by the material
19/32 Anodes
19/34 forming part of the envelope
19/36 Cooling of anodes
19/38 Control electrodes, e.g. grid
19/40 Screens for shielding (screens acting as control electrodes H01J 19/38)
19/42 Mounting, supporting, spacing, or insulating of electrodes or of electrode assemblies
19/44 Insulation between electrodes or supports within the vacuum space (leading-in conductors H01J 19/62)
19/46 Mountings for the electrode assembly as a whole
19/48 Mountings for individual electrodes (for directly-heated cathodes H01J 19/12)
19/50 Spacing members extending to the envelope
19/52 without fixed connection between spacing member and envelope
19/54 Vessels; Containers; Shields associated therewith
19/56 characterised by the material of the vessel or container
19/57 provided with coatings on the walls thereof; Selection of materials for the coatings
19/58 Seals between parts of vessels
19/60 Seals for leading-in conductors
19/62 Leading-in conductors
19/64 Means forming part of the tube for the purpose supporting it (associated with electrical connecting means H01J 19/66)
19/66 Means forming part of the tube for the purpose of providing electrical connection to it (H01J 5/46 - H01J 5/62 take precedence)
19/68 Specified gas introduced into the tube at low pressure, e.g. for reducing or influencing space charge
19/70 Means for obtaining or maintaining the vacuum, e.g. by gettering
19/72 Tubulations therefor, e.g. for exhausting; Closures therefor
19/74 Cooling arrangements (cooling of anodes H01J 19/36)
19/76 Means structurally associated with the tube for indicating defects or previous use
19/78 One or more circuit elements structurally associated with the tube
19/80 Structurally associated resonator having distributed inductance and capacitance
19/82 Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for

21/00 Vacuum tubes (H01J 25/00, H01J 31/00 - H01J 37/00, H01J 43/00 take precedence; details of vacuum tubes H01J 19/00; cathode ray or electron stream lamps H01J 63/00)
21/02 Tubes with a single discharge path
21/04 without control means, i.e. diodes
21/06 having electrostatic control means only
21/065 Devices for short wave tubes
21/08 with movable electrode or electrodes
21/10 with one or more immovable internal control electrodes, e.g. triode, pentode, octode
21/105 with microengineered cathode and control electrodes, e.g. Spindt-type)
21/12 Tubes with variable amplification factor
21/14 Tubes with means for concentrating the electron stream, e.g. beam tetrode
21/16 with external electrostatic control means and with or without internal control electrodes
21/18 having magnetic control means; having both magnetic and electrostatic control means
21/20 Tubes with more than one discharge path; Multiple tubes, e.g. double diode, triode-hexode (secondary-emission tubes, electron-multiplier tubes H01J 43/00)
21/22 with movable electrode or electrodes
21/24 with variable amplification factor
21/26 with means for concentrating the electron stream
21/34 Tubes with electrode system arranged or dimensioned so as to eliminate transit-time effect (with flat electrodes H01J 21/36)
21/36 Tubes with flat electrodes, e.g. disc electrode

23/00 Details of transit-time tubes of the types covered by group H01J 25/00
23/005 . (Cooling methods or arrangements (H01J 23/033 takes precedence))
23/02 . Electrodes; Magnetic control means; Screens (associated with resonator or delay system H01J 23/16)
23/027 . Collectors
23/0275 . . . [Multistage collectors]
23/033 . . . Collector cooling devices
23/04 . . . Cathodes
23/05 . . . having a cylindrical emissive surface, e.g. cathodes for magnetrons
23/06 . . . Electron or ion guns
23/065 . . . producing a solid cylindrical beam (H01J 23/075 takes precedence)
23/07 . . . producing a hollow cylindrical beam (H01J 23/075 takes precedence)
23/075 . . . Magnetron injection guns
23/08 . . . Focusing arrangements, e.g. for concentrating stream of electrons, for preventing spreading of stream
23/083 . . . Electrostatic focusing arrangements
23/087 . . . Magnetic focusing arrangements
23/0873 . . . . [with at least one axial-field reversal along the interaction space, e.g. P.P.M. focusing]
23/0876 . . . . [with arrangements improving the linearity and homogeneity of the axial field, e.g. field straightener]
23/09 . . . Electric systems for directing or deflecting the discharge along a desired path, e.g. E-type (focusing arrangements H01J 23/08)
23/10 . . . Magnet systems for directing or deflecting the discharge along a desired path, e.g. a spiral path (magnetic focusing arrangements H01J 23/08)
23/11 . . . Means for reducing noise (in electron or ion gun H01J 23/06)
23/12 . . . Vessels; Containers
23/14 . . . Leading-in arrangements; Seals therefor
23/15 . . . Means for preventing wave energy leakage structurally associated with tube leading-in arrangements, e.g. filters, chokes, attenuating devices
23/16 . . . Circuit elements, having distributed capacitance and inductance, structurally associated with the tube and interacting with the discharge (circuit elements, having distributed capacitance and inductance, in general H01P)
23/165 . . . (Manufacturing processes or apparatus therefor)
23/18 . . . Resonators
23/20 . . . Cavity resonators; Adjustment or tuning thereof
23/207 . . . . Tuning of single resonator
23/213 . . . . Simultaneous tuning of more than one resonator, e.g. resonant cavities of a magnetron
23/22 . . . Connections between resonators, e.g. strapping for connecting resonators of a magnetron
23/24 . . . Slow-wave structures, e.g. delay systems
23/26 . . . Helical slow-wave structures; Adjustment thereof
23/27 . . . . Helix-derived slow-wave structures
23/28 . . . . Interdigital slow-wave structures; Adjustment thereof
23/30 . . . Damping arrangements associated with slow-wave structures, e.g. for suppression of unwanted oscillations
23/34 . . . Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for
23/36 . . . Coupling devices having distributed capacitance and inductance, structurally associated with the tube, for introducing or removing wave energy
23/38 . . . . to or from the discharge
23/40 . . . . to or from the interaction circuit
23/42 . . . . the interaction circuit being a helix or a helix-derived slow-wave structure (H01J 23/44 - H01J 23/48 take precedence)
23/44 . . . . Rod-type coupling devices (H01J 23/46, H01J 23/48, H01J 23/54 take precedence)
23/46 . . . . Loop coupling devices
23/48 . . . . for linking interaction circuit with coaxial lines; Devices of the coupled helices type (H01J 23/46 takes precedence)
23/50 . . . . the interaction circuit being a helix or derived from a helix (H01J 23/52 takes precedence)
23/52 . . . . . the coupled helices being disposed coaxially around one another
23/54 . . . . . Filtering devices preventing unwanted frequencies or modes to be coupled to, or out of, the interaction circuit; Prevention of high frequency leakage in the environment
25/00 . . . . . Transit-time tubes, e.g. klystrons, travelling-wave tubes, magnetrons (details of transit-time tubes H01J 23/00; particle accelerators H05H)
25/005 . . . . [Gas-filled transit-time tubes]
25/02 . . . . Tubes with electron stream modulated in velocity or density in a modulator zone and thereafter giving up energy in an inducing zone, the zones being associated with one or more resonators (tubes in which a travelling-wave is simulated at spaced gaps H01J 23/34)
25/025 . . . . (with an electron stream following a helical path)
25/04 . . . . . Tubes having one or more resonators, without reflection of the electron stream, and in which the modulation produced in the modulator zone is mainly density modulation, e.g. Heaff tube
25/06 . . . . . Tubes having only one resonator, without reflection of the electron stream, and in which the modulation produced in the modulator zone is mainly velocity modulation, e.g. Lüdi-Klystron
25/08 . . . . . with electron stream perpendicular to the axis of the resonator
25/10 . . . . . Klystrons, i.e. tubes having two or more resonators, without reflection of the electron stream, and in which the stream is modulated mainly by velocity in the zone of the input resonator
25/11 . . . . . Extended interaction klystrons
25/12 . . . . . with pencil-like electron stream in the axis of the resonators
25/14 . . . . . with tube-like electron stream coaxial with the axis of the resonators
25/16 . . . . . with pencil-like electron stream perpendicular to the axis of the resonators
25/18 . . . . . with radial or disc-like electron stream perpendicular to the axis of the resonators
Tubes in which an electron stream interacts with a wave travelling along a delay line or equivalent sequence of impedance elements, and without a wave travelling along a delay line or equivalent sequence of impedance elements, and without an applied axial magnetic field. 

Tubes with plural reflection, e.g. Coeterier tube 

Travelling-wave tubes; Tubes in which a travelling wave is simulated at spaced gaps. 

Tubes in which an electron stream interacts with a wave travelling along a delay line or equivalent sequence of impedance elements, and without a wave travelling along a delay line or equivalent sequence of impedance elements, and without a wave travelling along a delay line or equivalent sequence of impedance elements, and without an applied axial magnetic field. 

The forward travelling wave being utilised 

The backward travelling wave being utilised 

Tubes in which two electron streams of different velocities interact with one another, e.g. electron-wave tube 

Tubes using the parametric principle, e.g. for parametric amplification 

Magnetrons, i.e. tubes with a magnet system producing an H-field crossing the E-field (with travelling wave moving completely around the electron space H01J 25/54; functioning with plural reflection or with reversed cyclotron action H01J 25/62, H01J 25/64) 

With an electron space having a shape that does not prevent any electron from moving completely around the cathode or guide electrode 

Having only one cavity or other resonator, e.g. neutrode tube (having a composite resonator H01J 25/58) 

Coaxial cavity magnetrons 

With interdigital arrangements of anodes, e.g. turbator tube 

Having a number of resonators; having a composite resonator, e.g. a helix 

Multi-cavity magnetrons 

Rising-sun magnetrons 

25/60 . . . with an electron space having a shape that prevents any electron from moving completely around the cathode or guide electrode; Linear magnetrons 

25/61 . . . Hybrid tubes, i.e. tubes comprising a klystron section and a travelling-wave section 

25/62 . . . Strophotrons, i.e. tubes with H-field crossing the E-field and functioning with plural reflection 

25/64 . . . Turbine tubes, i.e. tubes with H-field crossing the E-field and functioning with reversed cyclotron action 

25/66 . . . Tubes with electron stream crossing itself and thereby interacting or interfering with itself 

25/68 . . . Tubes specially designed to act as oscillator with positive grid and retarding field, e.g. for Barkhausen-Kurz oscillators (with secondary emission H01J 25/70) 

25/70 . . . with resonator having distributed inductance with capacitance, e.g. Pintsch tube 

25/72 . . . in which a standing wave or a considerable part thereof is produced along an electrode, e.g. Clavier tube (with resonator having distributed inductance and capacitance H01J 25/70) 

25/74 . . . Tubes specially designed to act as transit-time diode oscillators, e.g. monotron (with secondary emission H01J 25/76) 

25/76 . . . Dynamic electron-multiplier tubes, e.g. Farnsworth multiplier tube, multiplicator 

25/78 . . . Tubes with electron stream modulated by deflection in a resonator 

27/00 Ion beam tubes (H01J 25/00, H01J 33/00, H01J 37/00) take precedence; particle accelerators H05H) 

27/02 . . . Ion sources; Ion guns (for examination or processing discharge tubes H01J 37/08; ion sources, ion guns for particle spectrometer or separator tubes H01J 49/10; ion propulsion F03H 1/00; arrangements for handling particles, e.g. focusing, (charge exchanging, polarising) G21K 1/00; generating ions to be introduced into non-enclosed gases H01T 23/00; generating plasma H05H 1/24) 

27/022 . . . (Details) 

27/024 . . . (Extraction optics, e.g. grids) 

27/026 . . . (Cluster ion sources) 

27/028 . . . (Negative ion sources) 

27/04 . . . using reflex discharge, e.g. Penning ion sources ([electron bombardment ion sources H01J 27/08]) 

27/06 . . . without applied magnetic field 

27/08 . . . using arc discharge 

27/10 . . . Duoplasmatrons; (Duopigatrons) 

27/12 . . . provided with an expansion cup 

27/14 . . . Other arc discharge ion sources using an applied magnetic field 

27/143 . . . (Hall-effect ion sources with closed electron drift) 

27/146 . . . (End-Hall type ion sources, wherein the magnetic field confines the electrons in a central cylinder) 

27/16 . . . using high-frequency excitation, e.g. microwave excitation 

27/18 . . . with an applied axial magnetic field 

27/20 . . . using particle [beam] bombardment, e.g. ionisers 

27/205 . . . (with electrons, e.g. electron impact ionisation, electron attachment)
Details of cathode-ray tubes or of electron-beam tubes of the types covered by group H01J 31/00

29/003 . . . [Arrangements for eliminating unwanted electromagnetic effects, e.g. demagnetisation arrangements, shielding coils (H01J 29/06, H01J 29/867 take precedence; demagnetisation in general H01F 13/00; circuit arrangements therefor H04N 9/29; screening of apparatus against electric or magnetic fields H05K 9/00)]

29/006 . . . [Arrangements for eliminating unwanted temperature effects]

29/021 . . . (arrangements for eliminating interferences in the tube (H01J 29/484 takes precedence))

29/023 . . . (secondary-electron emitting electrode arrangements (secondary-emission tubes H01J 43/00))

29/025 . . . (Mounting or supporting arrangements for grids (H01J 29/028 takes precedence))

29/026 . . . (Mounting or supporting arrangements for charge storage screens not deposited on the frontplate)

29/028 . . . (Mounting or supporting arrangements for flat panel cathode ray tubes, e.g. spacers particularly relating to electrodes)

29/04 . . . Cathodes (electron guns H01J 29/48)

29/06 . . . Screens for shielding; Masks interposed in the electron stream

29/07 . . . Shadow masks for colour television tubes

29/073 . . . . . . (Mounting arrangements associated with shadow masks)

29/076 . . . . . . (characterised by the shape or distribution of beam-passing apertures)

29/08 . . . Electodes intimately associated with a screen on or from which an image or pattern is formed, picked up, converted, or stored, e.g. backing-plates for storage tube, for collecting secondary electrons (arrangements for colour switching H01J 29/80)

29/085 . . . . . . (Anode plates, e.g. for screens of flat panel displays)

29/10 . . . Screens on or from which an image or pattern is formed, picked up, converted or stored

29/12 . . . acting as light valves by shutter operation, e.g. for eidophor

29/14 . . . acting by discoloration, e.g. halide screen

29/16 . . . Incandescent screens

29/18 . . . Lucinescent screens

29/182 . . . . . . (acting upon the lighting-up of the luminescent material other than by the composition of the luminescent material, e.g. by infra red or UV radiation, heating or electric fields)

29/185 . . . . . . (measures against halo-phenomena)

29/187 . . . . . . (screens with more than one luminescent material (as mixtures for the treatment of the screens) (for several superimposed luminescent layers H01J 29/26; for adjacent dots or lines of different luminescent material H01J 29/32))

29/20 . . . characterised by the luminescent material (for luminescent screens for X-ray purposes G21K 4/00)

29/22 . . . characterised by the binder or adhesive for securing the luminescent material to its support, e.g. vessel

29/225 . . . . . . (photosensitive adhesive)

29/24 . . . Supports for luminescent material

29/26 . . . with superimposed luminescent layers

29/28 . . . with protective, conductive or reflective layers

29/30 . . . with luminescent material discontinuously arranged, e.g. in dots, in lines

29/32 . . . with adjacent dots or lines of different luminescent material, e.g. for colour television

29/322 . . . . . . (with adjacent dots)

29/325 . . . . . . (with adjacent lines)

29/327 . . . . . . (Black matrix materials)

29/34 . . . . . . provided with permanent marks or references

29/36 . . . . . . Photoelectric screens; Charge-storage screens

29/38 . . . . . . not using charge storage, e.g. photo-emissive screen, extended cathode (electrodes using photo-emission in general H01J 1/34)

29/385 . . . . . . (Photocathodes comprising a layer which modified the wave length of impinging radiation (luminescent layers sensitive to UV and X-rays C09K 11/00, G21K 4/00))

29/39 . . . Charge-storage screens (H01J 29/395 takes precedence)

29/395 . . . . . . (charge-storage grids exhibiting triode effect)

29/41 . . . . . . using secondary emission, e.g. for supericonoscope (electrodes using secondary emission in general H01J 1/32; secondary emission tubes H01J 43/00)

29/413 . . . . . . (for writing and reading of charge pattern on opposite sides of the target, e.g. for superorthicon)

29/416 . . . . . . (with a matrix of electrical conductors traversing the target)

29/43 . . . . . . using photo-emissive mosaic, e.g. for orthicon, for iconoscope

29/435 . . . . . . (with a matrix of conductors traversing the target)

29/44 . . . . . . exhibiting internal electric effects caused by particle radiation, e.g. bombardment-induced conductivity (particle detectors exhibiting internal electric effects G01T 1/26)

29/45 . . . . . . exhibiting internal electric effects caused by electromagnetic radiation, e.g. photoconductive screen, photodetector screen, photoelectric screen and photovoltaic screen (photoc conductive layers for electrography G03G 5/00)

29/451 . . . . . . (with photosensitive junctions)

29/453 . . . . . . (provided with diode arrays)
provided for G21K 1/00
particles, e.g. focusing, deviating, not otherwise
beam tubes for examining ions, e.g. electron or ion
microscopes, or processing of objects or materials,
e.g. electron or ion beam tubes H01J 37/04; electron
multipliers H01J 43/04; handling of radiation or
devices, e.g. focusing, deviating, not otherwise
provided for G21K 1/00

NOTE
H01J 29/48 - H01J 29/51 take precedence over
groups H01J 29/52 - H01J 29/68.

Electron guns

{Electron guns using field-emission, photo-
emission, or secondary-emission electron source}

{Electron guns using electron multiplication}

{Eliminating deleterious effects due to
thermal effects, electrical or magnetic fields;
Preventing unwanted emission (H01J 29/481
and H01J 29/482 take precedence)}

{Construction of the gun or of parts thereof
(H01J 29/481, H01J 29/482, H01J 29/484
and H01J 29/487 take precedence)}

{Replacing parts of the gun; Relative
adjustment of the electrodes (H01J 29/481
and H01J 29/482 take precedence; vacuum locks
H01J 29/865)}

{Schematic arrangements of the electrodes
for beam forming; Place and form of the
electrodes}

two or more guns in a single vacuum space,
e.g. for plural-ray tube (H01J 29/51 takes
precedence)

{Three or more guns, the axes of which lay
in a common plane}

{guns in delta or circular configuration}

Arrangements for controlling convergence of a
plurality of beams [by means of electric field
only]

Arrangements for controlling intensity of ray or
beam, e.g. for modulation ([H01J 29/467 takes
precedence])

{Digitally controlled systems, e.g. Digisplay}

Arrangements for centring ray or beam
([H01J 29/467 takes precedence])

Arrangements for controlling cross-section of ray
or beam; Arrangements for correcting aberration
of beam, e.g. due to lenses ([H01J 29/467 takes
precedence])

{for controlling cross-section}

{for correcting aberration}

Arrangements for focusing or reflecting ray
or beam ([H01J 29/467, H01J 29/585 take
precedence])

{in which the transit time of the electrons has
to be taken into account}

Mirrors

Electrostatic lenses

{producing fields exhibiting symmetry of
revolution}

{co-operating with or closely associated to
an electron gun}

{producing fields exhibiting periodic axial
symmetry, e.g. multipolar fields}

{co-operating with or closely associated to
an electron gun}

Magnetic lenses

using electromagnetic means only

using permanent magnets only

Arrangements for deflecting ray or beam
([H01J 29/467, H01J 29/525, H01J 29/701,
H01J 29/708 take precedence ]; circuit
arrangements for producing saw-tooth pulses or
other deflecting voltages or currents H03K)

{Systems for correcting deviation or
convergence of a plurality of beams by means of
magnetic fields at least}

{Convergence correction arrangements
thereof}

{Static convergence systems}

{Dynamic convergence systems}

{Deviation correction devices, i.e. having the
same action on each beam}

{Arrangements intimately associated with
parts of the gun and co-operating with
external magnetic excitation devices}

{in which the transit time of the electrons has
to be taken into account}

along one straight line or along two
perpendicular straight lines

Deflecting by electric fields only

Deflecting by magnetic fields only

{using saddle coils or printed windings
(coils per se H01F)}

{using toroidal windings}

{using saddle coils and
toroidal windings}

{using printed windings (printed windings
in general H01F 27/280; manufacturing
printed coils per se H01F 41/03; printed
circuits and apparatus or processes
for manufacturing printed circuits in
general H05K 1/00, e.g. H05K 30/02, and
H05K 30/03)}

along a circle, spiral or rotating radial line, e.g.
for radar display

Arrangements for controlling the ray or beam
after passing the main deflection system, e.g. for
post-acceleration or post-concentration, for colour
switching ([H01J 29/701 takes precedence])

{for post-acceleration or post-deflection, e.g.
for colour switching}

{Electron lens mosaics, e.g. fly's eye lenses,
colour selection lenses}
with the tube H01J 9/38
gettering of electric discharge tubes in general the tube, e.g. by gettering { ( exhausting, degassing, obtaining or maintaining the desired pressure within }
Selection of substances for gas fillings; Means for connecting H01R
providing electrical connection to it ( construction of }
Leading-in arrangements; Seals therefor

or separator tubes H01J 49/00

for velocity or mass selection ( particle spectrometer { or co-operating }  with }
and H01J 29/868
Selection of materials for the coatings { take }
implosion of vessels or containers H01J 29/06

{ Vessels or containers characterised by the form }
{ of flat panel cathode ray tubes }
{ Vessels or containers characterised by the material thereof }
{ Spacers between faceplate and backplate of flat panel cathode ray tubes }
{ Devices for introducing a recording support into the vessel }
{ Means associated with the outside of the vessel for shielding, e.g. magnetic shields ( screens for shielding inside the vessel H01J 29/06; magnetic shielding in general H05K 9/00) }
{ Screens covering the input or output face of the vessel, e.g. transparent anti-static coatings, X-ray absorbing layers }
Arrangements for preventing or limiting effects of implosion of vessels or containers

provided with coatings on the walls thereof; Selection of materials for the coatings { ( H01J 29/868 and H01J 29/89 take precedence ) ; luminescent screens H01J 29/18 }

Optical or photographic arrangements structurally combined { or co-operating } with the vessel { ( H01J 29/866 and H01J 29/868 take precedence ) }

{ using fibre optics }
{ Arrangements combined with the vessel for the purpose of image projection on a screen ( projection arrangements for image reproduction, e.g. using eidophor H04N 5/74 ) }

{ Anti-reflection means, e.g. eliminating glare due to ambient light }
{ Spectral filters }

Leading-in arrangements; Seals therefor

Means forming part of the tube for the purpose of providing electrical connection to it ( construction of connectors H01R )

{ High voltage anode feedthrough connectors for display tubes }

Selection of substances for gas fillings; Means for obtaining or maintaining the desired pressure within the tube, e.g. by gettering { ( exhausting, degassing, gettering of electric discharge tubes in general H01J 9/38 ) }

One or more circuit elements structurally associated with the tube

Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for

Cathode ray tubes; Electron beam tubes ( H01J 25/00; H01J 35/00; H01J 37/00 take precedence; cathode ray or electron stream lamps H01J 63/00; details of cathode ray tubes or of electron beam tubes H01J 29/00 )

having one or more output electrodes which may be impacted selectively by the ray or beam, and onto, from, or over which the ray or beam may be deflected or de-focused { ( pulse counting circuits therewith H03K 29/06 ) }

with only one or two output electrodes { with only two electrically independant groups or electrodes }

with more than two output electrodes, e.g. for multiple switching or counting

{ for electrography or electrophotography, for transferring a charge pattern through the faceplate ( leading-in arrangements H01J 29/90; Lenard tubes H01J 33/00; electrography or electrophotography per se G03C ) }

having a screen on or from which an image or pattern is formed, picked up, converted, or stored

Image or pattern display tubes, i.e. having electrical input and optical output; Flying-spot tubes for scanning purposes

with luminescent screen

{ tubes for oscillography ( colour display tubes H01J 31/20; cathode ray oscillography G01K 13/20 ) }

{ Direct viewing storage tubes without storage grid ( with storage grid H01J 31/18 ) }

{ Flat display tubes }

{ using electron beam scanning }

{ provided with control means permitting the electron beam to reach selected parts of the screen, e.g. digital selection }

{ using line sources }

{ using large area or array sources, i.e. essentially a source for each pixel group }

{ provided with control means permitting the electron beam to reach selected parts of the screen, e.g. digitally controlled display tubes ( H01J 31/123 takes precedence ) }

Magic-eye or analogous tuning indicators { ( mounting of visual indicators in a radio set H01J 11/04; circuits for timing indicators H03J 31/14 ) }

with ray or beam selectively directed to luminescent anode segments { ( printing by application of radiation B41J 24/47 ) }

with mask carrying a number of selectively displayable signs, e.g. charactron, numeroscope { ( tubes with a mask carrying a matrix of openings, a selection of which permits a sign to be displayed H01J 31/128 ) }

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31/18 . . . with image written by a ray or beam on a grid-like charge-accumulating screen, and with a ray or beam passing through and influenced by this screen before striking the luminescent screen, e.g. direct-view storage tube (charge storage grids exhibiting triode effect H01J 29/395)

31/20 . . . for displaying images or patterns in two or more colours (circuits for colour television H04N 9/16 - H04N 9/23)

31/201 . . . [using a colour-selection electrode]

31/203 . . . (with more than one electron beam)

31/205 . . . { with three electron beams in delta configuration }

31/206 . . . { with three coplanar electron beams }

31/208 . . . { using variable penetration depth of the electron beam in the luminescent layer, e.g. penetrators }

31/22 . . . for stereoscopic displays

31/24 . . . with screen acting as light valve by shutter operation, e.g. eidophor (projection arrangements for image reproduction, e.g. using eidophor H04N 5/74)

31/26 . . . Image pick-up tubes having an input of visible light and electric output (tubes without defined electron beams and having a light ray scanning photo-emissive screen H01J 40/20)

31/265 . . . { with light spot scanning }

31/28 . . . with electron ray scanning the image screen (H01J 31/283, H01J 31/286 take precedence)

31/283 . . . { with a target comprising semiconductor junctions }

31/286 . . . { correlator tubes }

31/30 . . . having regulation of screen potential at anode potential, e.g. iconoscope

31/32 . . . . . . Tubes with image amplification section, e.g. image-iconoscope, supericonoscope

31/34 . . . having regulation of screen potential at cathode potential, e.g. orthicon

31/36 . . . . . . Tubes with image amplification section, e.g. orthiconoscope

31/38 . . . . . . Tubes with photoconductive screen, e.g. vidicon

31/40 . . . . . . having grid-like image screen through which the electron ray passes and by which the ray is influenced before striking the output electrode, i.e. having "triode action"

31/42 . . . with image screen generating a composite electron beam which is deflected as a whole past a stationary probe to simulate a scanning effect, e.g. Farnsworth pick-up tube

31/44 . . . . . . Tubes with image amplification section

31/46 . . . . . . Tubes in which electrical output represents both intensity and colour of image (colour television cameras with only one tube H04N 9/07)

31/48 . . . Tubes with amplification of output effected by electron multiplier arrangements within the vacuum space

31/49 . . . . . . Pick-up adapted for an input of electromagnetic radiation other than visible light and having an electric output, e.g. for an input of X-rays, for an input of infra-red radiation

31/495 . . . Pick-up tubes adapted for an input of sonic, ultrasonic, or mechanical vibrations and having an electric output

31/50 . . . Image-conversion or image-amplification tubes, i.e. having optical, X-ray, or analogous input, and optical output

31/501 . . . { with an electrostatic electron optic system (H01J 31/52 - H01J 31/56 take precedence) }

31/502 . . . { with means to interrupt the beam, e.g. shutter for high speed photography (circuits using electron-beam shutters G03B 27/725) }

31/503 . . . { with an electromagnetic electron-optic system (H01J 31/52 - H01J 31/56 take precedence) }

31/504 . . . { flat tubes, e.g. proximity focusing tubes }

31/505 . . . { tubes using secondary emission effect }

31/507 . . . { using a large number of channels, e.g. microchannel plates }

31/508 . . . { Multistage converters }

31/52 . . . having grid-like image screen through which the electron ray or beam passes and by which the ray or beam is influenced before striking the luminescent output screen, i.e. having "triode action"

31/54 . . . in which the electron ray or beam is reflected by the image input screen on to the image output screen

31/56 . . . for converting or amplifying images in two or more colours

31/58 . . . Tubes for storage of image or information pattern or for conversion of definition of television or like images, i.e. having electrical input and electrical output (electrostatic memories using electron beam tubes G11C 11/23)

31/585 . . . { Monoscopes (H01J 31/60 takes precedence) }

31/60 . . . having means for deflecting, either selectively or sequentially, an electron ray on to separate surface elements of the screen (by circuitry alone H01J 29/08)

31/62 . . . . . . with separate reading and writing rays

31/64 . . . . . . on opposite sides of screen, e.g. for conversion of definition

31/66 . . . having means for allowing all but selected cross-section elements of a homogeneous electron beam to reach corresponding elements of the screen, e.g. selector

31/68 . . . . . . in which the information pattern represents two or more colours

33/00 Discharge tubes with provision for emergence of electrons or ions from the vessel (irradiation devices G21K) ; particle accelerators H05H ; Lenard tubes

33/02 . . . Details (vessels for operation at high tension H01J 5/06)

33/04 . . . Windows

35/00 X-ray tubes

35/02 . . . Details

35/025 . . . [X-ray tubes with structurally associated circuit elements]

35/04 . . . Electrodes (Mutual position thereof; Constructional adaptations therefor)

35/045 . . . [Electrodes for controlling the current of the cathode ray, e.g. control grids]
H01J

35/06 . . . Cathodes

**WARNING**

Group H01J 35/06 is impacted by reclassification into groups H01J 35/064 and H01J 35/066.
Groups H01J 35/06 and H01J 35/064 and H01J 35/066 should be considered in order to perform a complete search.

35/064 . . . [Details of the emitter, e.g. material or structure (H01J 35/065 takes precedence)]

**WARNING**

Group H01J 35/064 is incomplete pending reclassification of documents from group H01J 35/06.
Groups H01J 35/06 and H01J 35/064 should be considered in order to perform a complete search.

35/065 . . . [Field emission, photo emission or secondary emission cathodes]

35/066 . . . [Details of electron optical components, e.g. cathode cups]

**WARNING**

Group H01J 35/066 is incomplete pending reclassification of documents from group H01J 35/06.
Groups H01J 35/06 and H01J 35/064 should be considered in order to perform a complete search.

35/08 . . . Anodes; Anti cathodes

**WARNING**

Group H01J 35/08 is impacted by reclassification into groups H01J 35/112 and H01J 35/116.
Groups H01J 35/08 and H01J 35/112 and H01J 35/116 should be considered in order to perform a complete search.

35/10 . . . Rotary anodes; Arrangements for rotating anodes; Cooling rotary anodes

35/101 . . . . [Arrangements for rotating anodes, e.g. supporting means, means for greasing, means for sealing the axle or means for shielding or protecting the driving]

**WARNING**

Group H01J 35/101 is impacted by reclassification into groups H01J 35/1017, H01J 35/1024 and H01J 35/104.
All groups listed in this Warning should be considered in order to perform a complete search.

35/1017 . . . . . [Bearings for rotating anodes]

**WARNING**

Groups H01J 35/1017, H01J 35/1024 and H01J 35/104 are incomplete pending reclassification of documents from group H01J 35/101.
Groups H01J 35/101, H01J 35/1017, H01J 35/1024 and H01J 35/104 should be considered in order to perform a complete search.

35/1024 . . . . . [Rolling bearings]

35/103 . . . . . . [Magnetic bearings]

35/104 . . . . . . [Fluid bearings]

35/105 . . . . . . [Cooling of rotating anodes, e.g. heat emitting layers or structures]

**WARNING**

Group H01J 35/105 is impacted by reclassification into group H01J 35/107.
Groups H01J 35/105 and H01J 35/107 should be considered in order to perform a complete search.

35/106 . . . . . [Active cooling, e.g. fluid flow, heat pipes]

**WARNING**

Group H01J 35/106 is impacted by reclassification into group H01J 35/107.
Groups H01J 35/106 and H01J 35/107 should be considered in order to perform a complete search.

35/107 . . . . . [Cooling of the bearing assemblies]

**WARNING**

Group H01J 35/107 is incomplete pending reclassification of documents from groups H01J 35/105 and H01J 35/106.
Groups H01J 35/105, H01J 35/106 and H01J 35/107 should be considered in order to perform a complete search.

35/108 . . . . . [Substrates for and bonding of emissive target, e.g. composite structures]

35/112 . . . . . [Non-rotating anodes (H01J 35/12 takes precedence)]

**WARNING**

Group H01J 35/112 is incomplete pending reclassification of documents from group H01J 35/08.
Groups H01J 35/08 and H01J 35/112 should be considered in order to perform a complete search.
35/116 . . . . [Transmissive anodes (acting as a window H01J 35/186)]

**WARNING**

Group H01J 35/116 is incomplete pending reclassification of documents from group H01J 35/08.
Groups H01J 35/08 and H01J 35/116 should be considered in order to perform a complete search.

35/12 . . . . Cooling non-rotary anodes

**WARNING**

Group H01J 35/12 is impacted by reclassification into group H01J 35/13.
Groups H01J 35/12 and H01J 35/13 should be considered in order to perform a complete search.

35/13 . . . . [Active cooling, e.g. fluid flow, heat pipes]

**WARNING**

Group H01J 35/13 is incomplete pending reclassification of documents from group H01J 35/12.
Groups H01J 35/12 and H01J 35/13 should be considered in order to perform a complete search.

35/14 . . . . Arrangements for concentrating, focusing, or directing the cathode ray

**WARNING**

Group H01J 35/14 is impacted by reclassification into groups H01J 35/147 and H01J 35/153.
Groups H01J 35/14 and H01J 35/147 and H01J 35/153 should be considered in order to perform a complete search.

35/147 . . . . [Spot size control]

**WARNING**

Group H01J 35/147 is incomplete pending reclassification of documents from group H01J 35/14.
Groups H01J 35/14 and H01J 35/147 should be considered in order to perform a complete search.

35/153 . . . . [Spot position control]

**WARNING**

Group H01J 35/153 is incomplete pending reclassification of documents from group H01J 35/14.
Groups H01J 35/14 and H01J 35/153 should be considered in order to perform a complete search.

35/16 . . . . Vessels; Containers; Shields associated therewith
35/165 . . . . [joining connectors to the tube]

35/18 . . . . Windows

**WARNING**

Group H01J 35/18 is impacted by reclassification into group H01J 35/186.
Groups H01J 35/18 and H01J 35/186 should be considered in order to perform a complete search.

35/186 . . . . [used as targets or X-ray converters]

**WARNING**

Group H01J 35/186 is incomplete pending reclassification of documents from group H01J 35/18.
Groups H01J 35/18 and H01J 35/186 should be considered in order to perform a complete search.

35/20 . . . . Selection of substances for gas fillings; Means for obtaining or maintaining the desired pressure within the tube, e.g. by gettering
35/22 . . . . specially designed for passing a very high current for a very short time, e.g. for flash operation
35/24 . . . . Tubes wherein the point of impact of the cathode ray on the anode or anticathode is movable relative to the surface thereof
35/26 . . . . by rotation of the anode or anticathode
35/28 . . . . by vibration, oscillation, reciprocation, or swash-plate motion of the anode or anticathode
35/30 . . . . by deflection of the cathode ray
35/305 . . . . [by using a rotating X-ray tube in conjunction therewith]
35/32 . . . . Tubes wherein the X-rays are produced at or near the end of the tube or a part thereof which tube or part has a small cross-section to facilitate introduction into a small hole or cavity

37/00 Discharge tubes with provision for introducing objects or material to be exposed to the discharge, e.g. for the purpose of examination or processing thereof (H01J 33/00, H01J 40/00, H01J 41/00, H01J 47/00, H01J 49/00 take precedence; scanning-probe techniques or apparatus G01Q); contactless testing of electronic circuits using electron beams G01R 31/305; particle accelerators H05H)

37/02 . . . . Details
37/023 . . . . {Means for mechanically adjusting components not otherwise provided for (mechanically adjusting from the outside of electron or ion-optical components H01J 37/067; positioning the object or material H01J 37/20; vacuum locks, means for obtaining or maintaining the desired pressure within the tube H01J 37/18; other manipulating devices H01L 21/48, G21F)}
37/026 . . . . [Means for avoiding or neutralising unwanted electrical charges on tube components]
37/04 . . . . Arrangements of electrodes and associated parts for generating or controlling the discharge, e.g. electron-optical arrangement, ion-optical arrangement {electron or ion-optical systems for localised treatment of materials H01J 37/3007; discharge control means in gas filled discharge tubes H01J 37/32009}
37/045 . . .  [Beam blanking or chopping, i.e. arrangements for momentarily interrupting exposure to the discharge]
37/05 . . .  Electron or ion-optical arrangements for separating electrons or ions according to their energy (or mass) (particle separator tubes H01J 49/00)
37/06 . . .  Electron sources; Electron guns (electron sources in general H01J 1/02, H01J 19/02; electron guns in general H01J 30/02)
37/061 . . .  [Electron guns using electron multiplication]
37/063 . . .  Geometrical arrangement of electrodes for beam-forming
37/065 . . .  Construction of guns or parts thereof (H01J 37/067 - H01J 37/077 take precedence)
37/067 . . .  Replacing parts of guns; Mutual adjustment of electrodes (H01J 37/073 - H01J 37/077 take precedence; vacuum locks H01J 37/18)
37/07 . . .  Eliminating deleterious effects due to thermal effects or electric or magnetic fields (H01J 37/073 - H01J 37/077 take precedence)
37/073 . . .  Electron guns using field emission, photo emission, or secondary emission electron sources
37/075 . . .  Electron guns using thermionic emission from cathodes heated by particle bombardment or by irradiation, e.g. by laser
37/077 . . .  Electron guns using discharge in gases or vapours as electron sources
37/08 . . .  Ion sources; Ion guns
37/09 . . .  Diaphragms; Shields associated with electron or ion-optical arrangements; Compensation of disturbing fields
37/10 . . .  Lenses
37/12 . . .  Electrostatic
37/14 . . .  Magnetic
37/141 . . .  Electromagnetic lenses
37/1413 . . .  [Means for interchanging parts of the lens, e.g. pole pieces, within the tube (mechanically adjusting electron (ion) optical components H01J 37/15)]
37/1416 . . .  [with superconducting coils]
37/143 . . .  Permanent magnetic lenses
37/145 . . .  Combinations of electrostatic and magnetic lenses
37/147 . . .  Arrangements for directing or deflecting the discharge along a desired path (H01J 37/045 takes precedence); lenses H01J 37/10)
37/1471 . . .  [for centering, aligning or positioning of ray or beam]
37/1472 . . .  [Deflecting along given lines]
37/1474 . . .  [Scanning means]
37/1475 . . .  [magnetic]
37/1477 . . .  [Electrostatic]
37/1478 . . .  [Beam tilting means, i.e. for stereoscopy or for beam channelling]
37/15 . . .  External mechanical adjustment of electron or ion optical components (H01J 37/067, H01J 37/20 take precedence)
37/153 . . .  Electron-optical or ion-optical arrangements for the correction of image defects, e.g. stigmators
37/16 . . .  Vessels; Containers
37/165 . . .  [Means associated with the vessel for preventing the generation of or for shielding unwanted radiation, e.g. X-rays]
37/18 . . .  Vacuum locks; Means for obtaining or maintaining the desired pressure within the vessel (vacuum locks for electron-beam tubes in general H01J 29/865)
37/185 . . .  [Means for transferring objects between different enclosures of different pressure or atmosphere]
37/20 . . .  Means for supporting or positioning the objects or the material; Means for adjusting diaphragms or lenses associated with the support (introducing the objects H01J 37/18; preparing specimens for investigation G01N 1/06, G01N 1/28)
37/21 . . .  Means for adjusting the focus (adjusting the focus while observing the image by photographic or optical means H01J 37/22; means for observing the object or the point of impact on the object in tubes for the localised treatment of materials H01J 37/3005)
37/22 . . .  Optical or photographic arrangements associated with the tube (using a CRT for the display of the image in a scanning electron microscope H01J 37/28; observing the object or the point of impact on the object in tubes for the localised treatment of materials H01J 37/3007)
37/222 . . .  [Image processing arrangements associated with the tube (image data processing or generation, in general G06T)]
37/224 . . .  [Luminescent screens or photographic plates for imaging (photosensitive materials for photographic purposes G03C); Apparatus specially adapted therefor, e.g. cameras, TV-cameras, photographic equipment, exposure control; Optical subsystems specially adapted therefor, e.g. microscopes for observing image on luminescent screen]
37/226 . . .  [Optical arrangements for illuminating the object; optical arrangements for collecting light from the object]
37/228 . . .  [whereby illumination and light collection take place in the same area of the discharge]
37/24 . . .  Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for
37/241 . . .  [High voltage power supply or regulation circuits (components H01J 37/248)]
37/242 . . .  [Filament heating power supply or regulation circuits (H01J 37/241 takes precedence)]
37/243 . . .  [Beam current control or regulation circuits (H01J 37/241 takes precedence)]
37/244 . . .  Detectors; Associated components or circuits therefor (detectors per se G01T)
37/248 . . .  Components associated with high voltage supply (Means for measuring the high voltage per se G01R 15/00); high voltage supply per se H02J, H02M)
37/252 . . .  Tubes for spot-analysing by electron or ion beams; Microanalysers (investigating or analysing thereby G01N 23/22)
37/256 . . .  using scanning beams
37/26 . . .  Electron or ion microscopes; Electron or ion diffraction tubes
37/261 . . .  [Details]
Electron-beam or ion-beam tubes for localised implantation (H01J 37/36 applying thin layers thereon, e.g. for ion for changing properties of the objects or for welding { (methods for welding metals with drilling metals with electron beams B23K 15/00) }

{ (methods for casting or melting of metals with electron beam or gas discharges C22B 9/22) }

for casting, melting, evaporating or etching signals the objects { or from the beam } , e.g. correction Controlling tubes by information coming from precedence )

{ Particle-beam lithography, e.g. electron beam implantation H01J 37/32412 { for ion implantation ( plasma immersion ion implantation H01I 37/32412) } }

Gas-filled discharge tubes, [e.g. for surface treatment of objects such as coating, plating, etching, sterilising or bringing about chemical reactions] { (general methods or devices for heat treatments of ferrous or non-ferrous metals or alloys by cathodic discharges C21D 1/38; methods of carburising or nitriding of metals in general C23C 8/00; methods for coating, plating or surface treating of or with metallic material C23C N/36, C23C 14/32, C23C 16/50; methods for coating, plating or surface treating of or with semiconductors H01L 21/00 ) heating by discharge H05B) }

{ Arrangements for generation of plasma specially adapted for examination or treatment of objects, e.g. plasma sources (plasma generation in general H05H 1/24) }

(Glow discharge)

{ DC powered) }

{ AC powered) }

{ Circuits specially adapted for controlling the glow discharge) }

{ Arc discharge) }

{ Circuits specially adapted for controlling the arc discharge (for plasma torches H01H 1/36) }

{ Corona discharge) }

{ (Radio frequency generated discharge (H01J 37/32357, H01J 37/32366, H01J 37/32394 and H01J 37/32403 take precedence) ) }

{ the radio frequency energy being capacitively coupled to the plasma) }

{ the radio frequency energy being inductively coupled to the plasma) }

{ Antennas, e.g. particular shapes of coils) }

{ Windows) }

{ using particular waveforms, e.g. polarised waves) }

{ Circuits specially adapted for controlling the RF discharge) }

{ Matching circuits, impedance matching circuits per se H03H 7/38 and H03H 7/40) }

{ Microwave generated discharge (H01J 37/32357, H01J 37/32366, H01J 37/32394, H01J 37/32403 take precedence) ) }

{ Generating means) }

{ Means for coupling power to the plasma) }

{ Antennas) }

{ Waveguides) }

{ Windows) }

{ Resonators) }

{ Tuning means) }

{ Means for controlling power transmitted to the plasma) }

{ Microwave reflectors) }

{ Means for controlling or selecting resonance mode) }
{ Constructional details of the reactor }  
{ Electrostatic control }  
{ Magnetic control means }  
{ Mechanical discharge control means }  
{ Electrodes }  
{ Vessel }  
{ Gas supply means }  
{ Treating interior parts of workpieces }  
{ Generation remote from the workpiece, e.g. down-stream }  
{ Localised processing }  
{ Arrangement for selecting ions or species in workpieces }  
{ Treating interior parts of workpieces }  
{ Treating multiple sides of workpieces, e.g. 3D workpieces }  
{ Plasma immersion ion implantation }  
{ Arrangement for selecting ions or species in the plasma }  
{ Constructional details of the reactor }  
{ Gas supply means }  
{ Gas control, e.g. control of the gas flow }  
{ Vessel }  
{ Material }  
{ characterised by the means for protecting vessels or internal parts, e.g. coatings }  
{ Means for reducing recombination coefficient }  
{ Means for protecting the vessel against plasma }  
{ Means for preventing sputtering of the vessel }  
{ Sealing means, e.g. sealing between different parts of the vessel }  
{ Temperature }  
{ Electrodes }  
{ Shape }  
{ Material }  
{ Protection means, e.g. coatings }  
{ Relative arrangement or disposition of electrodes; moving means }  
{ Electrical connecting means }  
{ Triode systems }  
{ Hollow cathodes }  
{ Removable or replaceable electrodes or electrode systems }  
{ Consumable cathodes for arc discharge }  
{ Mechanical discharge control means }  
{ Baffles }  
{ Focus rings }  
{ Shields, e.g. dark space shields, Faraday shields }  
{ Magnetic control means }  
{ Particular magnets or magnet arrangements for controlling the discharge }  
{ Electron cyclotron resonance }  
{ Multi-cusp fields }  
{ Electrostatic control }  
{ Polarising the substrate }  
{ Workpiece holder }  
{ Temperature }  
{ Means for moving the material to be treated }  
{ for introducing the material into processing chamber }  
{ for moving the material across the discharge }  
{ Continuous moving }  
{ of continuous material }  
{ of batches of workpieces }  
{ for extracting the material from the process chamber }  
{ Further details of plasma apparatus not provided for in groups H01J 37/3244 - H01J 37/3278; special provisions for cleaning or maintenance of the apparatus }  
{ Construction (includes replacing parts of the apparatus) }  
{ Pressure }  
{ Working under atmospheric pressure or higher }  
{ Exhausting }  
{ Treating effluent gases }  
{ Hygiene }  
{ In situ cleaning of vessels and/or internal parts }  
{ Means for trapping or directing unwanted particles }  
{ Maintenance }  
{ Connection or combination with other apparatus }  
{ Multiple chambers, e.g. cluster tools }  
{ Utilities }  
{ Plasma diagnostics }  
{ Software, data control or modelling }  
{ Monitoring and controlling tubes by information coming from the object and/or discharge }  
{ Arc detection }  
{ Electron temperature measurement }  
{ End-point detection }  
{ Spectral analysis }  
{ Gas analysis }  
{ Feedback systems }  
{ operating with cathodic sputtering (H01J 37/36 takes precedence ; methods of cathodic sputtering C23C 14/34) }  
{ using supplementary magnetic fields }  
{ Magnetron sputtering }  
{ Planar magnetron sputtering }  
{ Constructional aspects of the reactor }  
{ Targets }  
{ Arrangements }  
{ Hollow targets }  
{ Shape }  
{ Material }  
{ Plural materials }  
{ Target-material dispenser }  
{ Target holders (includes backing plates and endblocks) }  
{ Electrodes other than cathode }  
{ Dark space shields }
Discharge tubes for measuring pressure of introduced gas [or for detecting presence of gas];
Discharge tubes for evacuation by diffusion of ions

- with ionisation by means of cold cathodes
- with ionisation by means of radioactive substances, e.g. alphatrons
- of particle spectrometer type (particle spectrometers per se)
- Discharge tubes for evacuating by diffusion of ions, e.g. ion pumps, getter ion pumps
- with ionisation by means of thermionic cathodes
- using gettering substances
- with ionisation by means of cold cathodes
- using gettering substances

Secondary-emission tubes; Electron-multiplier tubes
(dynamic electron-multiplier tubes H01J 25/76; secondary-emission detectors for measurement of nuclear or X-radiation G01T 1/28)

- Tubes in which one or a few electrodes are secondary-electron emitting electrodes
- [Circuits therefor]
- Electron multipliers [(if forming part of electron gun H01J 3/023)]
- [Position sensitive electron multipliers]
- Electrode arrangements
- Cathode arrangements [(photo- emissive electrodes H01J 1/24, H01J 1/32); construction of photo cathodes H01J 40/06, H01J 49/16, H01J 47/00, H01J 49/38)
- Dynodes (H01J 43/24, H01J 43/26 take precedence; secondary-electron-emitting electrodes in general H01J 1/32)
- Anode arrangements
- Control of electron beam by magnetic field
- Electrode arrangements using essentially one dynode
- Electrode arrangements using essentially more than one dynode
- Dynodes consisting of sheet material, e.g. plane, bent
- Dynodes consisting of electron-permeable material, e.g. foil, grid, tube, venetian blind
- Dynodes having potential gradient along their surfaces
- [Dynodes consisting of a piling-up of channel-type dynode plates]
- [Microchannel plates [MCP] (image amplification tubes using MCP H01J 3/507)]
- Box dynodes
- Vessels [wall of the tube]; Windows; Screens; Suppressing undesired discharges or currents
- Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for

Discharge tubes functioning as thermionic generators [(structural combination of fuel element with thermoelectric element G21C 3/40); nuclear power plants using thermionic converters G21D 7/04; structural combination of a radioactive source with a thermionic converter, e.g. radioisotope batteries G21H 1/10; generators in which thermal or kinetic energy is converted into electrical energy by ionisation of a fluid and removal of the charge therefrom H02N 3/00)]
47/00  Tubes for determining the presence, intensity, density or energy of radiation or particles
((discharge tubes using igniting by associated radioactive materials or fillings, e.g. current stabilising tubes H01J 47/17)) : photoelectric discharge tubes not involving the ionisation of a gas H01J 40/00 ; discharge tubes for measuring the pressure, partial pressure of introduced gas or for detecting presence of gas H01J 41/02 ; ionisation chambers using a solid dielectric G01T 3/008))

47/001  . . . (Details)
47/002  . . . (Vessels or containers)
47/003  . . . (using tissue-equivalent materials)
47/004  . . . (Windows permeable to X-rays, gamma-rays, or particles (windows for discharge tubes with provision for emergence of electrons or ions from the vessel H01J 33/04 ; windows for X-ray tubes H01J 35/18))
47/005  . . . (Gas fillings (H01J 47/12 takes precedence); Maintaining the desired pressure within the tube)
47/006  . . . (Tissue equivalent gas fillings)
47/007  . . . (Flash detectors)
47/008  . . . (Drift detectors)
47/002  . . . (Ionisation chambers)
47/022  . . . (Calibration thereof)
47/024  . . . (Well-type ionisation chambers)
47/026  . . . (Gas flow ionisation chambers)
47/028  . . . (using a liquid dielectric)
47/04  . . . Capacitive ionisation chambers, e.g. the electrodes of which are used as electrometers
47/06  . . . (Proportional counter tubes)
47/062  . . . (Multiwire proportional counter tubes)
47/065  . . . (Well-type proportional counter tubes)
47/067  . . . (Gas flow proportional counter tubes)
47/08  . . . (Geiger-Müller counter tubes ((gas filling with very short deionisation times H01J 17/64, H01T))
47/10  . . . (Spark counters (H01J 47/14 takes precedence; spark gaps H01T)
47/12  . . . (Neutron detector tubes, e.g. BF3 tubes)
47/1205  . . . (using nuclear reactions of the type (n, alpha) in solid materials, e.g. Boron-10 (n, alpha) Lithium-7, Lithium-6 (n, alpha) Hydrogen-3)
47/1211  . . . (Ionisation chambers)
47/1216  . . . (Gamma compensated)
47/1222  . . . (Proportional counters)
47/1227  . . . (Fission detectors)
47/1233  . . . (Ionisation chambers)
47/1238  . . . (Counters)
47/1244  . . . (Multiwire counters)
47/125  . . . (Helium ionisation detectors)
47/1255  . . . (Ionisation chambers)
47/1261  . . . (Counters)
47/1266  . . . (Multi-wire counters)
47/1272  . . . (BF3 tubes)
47/1277  . . . (Light-nuclei-recoil ionisation detectors, e.g. using protons, alpha-particles)
47/1283  . . . (Ionisation chambers)
47/1288  . . . (Counters)
47/1294  . . . (Multi-wire counters)

47/14  . . . Parallel electrode spark or streamer chambers; Wire spark or streamer chambers ((circuit arrangements with multi-wire or parallel-plate chambers for recording of movements or tracks of particles G01T 5/12))
47/16  . . . characterised by readout of each individual wire
47/18  . . . the readout being electrical (H01J 47/20 takes precedence)
47/20  . . . the readout employing electrical or mechanical delay lines, e.g. magnetostrictive delay lines
47/22  . . . characterised by another type of readout
47/24  . . . the readout being acoustical
47/26  . . . the readout being optical

49/00  Particle spectrometers or separator tubes

NOTE
In classifying particle separators, no distinction is made between spectrometry and spectrography, the difference being only in the manner of detection which in the first case is electrical and in the second case is by means of a photographic film.

49/0004  . . . (Imaging particle spectrometry)
49/0009  . . . (Calibration of the apparatus)
49/0013  . . . (Miniaturised spectrometers, e.g. having smaller than usual scale, integrated conventional components)
49/0018  . . . (Microminiaturised spectrometers, e.g. chip-integrated devices, MicroElectro-Mechanical Systems [MEMS])
49/0022  . . . (Portable spectrometers, e.g. devices comprising independent power supply, constructional details relating to portability (small scale devices per se H01J 49/0013 and H01J 49/0018))
49/0027  . . . (Methods for using particle spectrometers)
49/0031  . . . (Step by step routines describing the use of the apparatus (H01J 49/0081 takes precedence))
49/0036  . . . (Step by step routines describing the handling of the data generated during a measurement (recognising patterns in signals G06K 9/00496))
49/0004  . . . (Combinations of spectrometers, tandem spectrometers, e.g. MS/MS, MSn)
49/0045  . . . (characterised by the fragmentation or tandem spectrometers, other specific reaction)
49/0005  . . . (by collision with gas, e.g. by introducing gas or by accelerating ions with an electric field)
49/0054  . . . (by an electron beam, e.g. electron impact dissociation, electron capture dissociation)
49/0059  . . . (by a photon beam, photo-dissociation)
49/0063  . . . (by applying a resonant excitation voltage)
49/0068  . . . (by collision with a surface, e.g. surface induced dissociation)
49/0072  . . . (by ion/ion reaction, e.g. electron transfer dissociation, proton transfer dissociation)
49/0077  . . . (specific reactions other than fragmentation)
49/0081  . . . (Tandem in time, i.e. using a single spectrometers)
49/0086  . . . (Accelerator mass spectrometers)
49/009  . . . (Spectrometers having multiple channels, parallel analysis)
49/0095  . . . (Particular arrangements for generating, introducing or analyzing both positive and negative analyte ions (ion/ion reactions H01J 49/0072))
49/02  . . . Details
Electron- or ion-optical arrangements or ion-optical components

Arrangements for external adjustment of electron-

Arrangements for introducing or extracting samples to be analysed, e.g. vacuum locks; Arrangements for external adjustment of electron- or ion-optical components

Capillaries used for transferring samples or ions (electrospray nozzles H01J 49/167)

Sample holders or containers (containers for retaining a material to be analyzed, B01L 3/50, for DNA, C12Q 1/6834, for biological materials, G01N 33/543)

[for automated handling]

[for laser desorption, e.g. matrix-assisted laser desorption/ionisation (MALDI), surface enhanced laser desorption/ionisation (SELDI) plates]

[for gaseous samples (interfaces to gas chromatographs G01N 30/7206)]

[using a membrane permeable to gases]

[for liquid samples (interfaces to liquid chromatographs G01N 30/7233)]

[using a membrane permeable to liquids]

[with means for preventing droplets from entering the analyzer; Desolvation of droplets]

[with means for introducing as a spray, a jet or an aerosol (electrospray ion sources H01J 49/165)]

[with means for using a nebulising gas, i.e. pneumatically assisted]

[with means for vaporising using mechanical energy, e.g. by ultrasonic vibrations]

[for solid samples]

[Desorption by laser or particle beam, followed by ionisation as a separate step (sample holder per se H01J 49/0418)]

[with means for heating or cooling the sample]

[with means for pyrolysis]

[using a hot fluid]

[with means for collisional cooling]

[with means for monitoring the sample temperature]

[with means for applying heat to desorb the sample; Evaporation]

[Vacuum locks; Valves (valves per se F16K)]

Electron- or ion-optical arrangements

Ion deflecting means, e.g. ion gates

Ion guides (linear ion traps performing mass selection H01J 49/4225, mass filters H01J 49/421)

Multipole ion guides, e.g. quadrupoles, hexapoles

Electron sources, e.g. for generating photo-electrons, secondary electrons or Auger electrons

Ions sources; Ion guns

[using reflex discharge, e.g. Penning ion sources]

[using high-frequency excitation, e.g. microwave excitation, Inductively Coupled Plasma (ICP)]

[Arrangements for using several ion sources]

using an arc discharge, e.g. of the duoplasmatron type

[Duoplasmatrons]

[Other arc discharge ion sources using an applied magnetic field]

using particle bombardment, e.g. ionisation chambers

[using a solid target which is not previously vapourised]

[using chemical ionisation]

[with electrons, e.g. electron impact ionisation, electron attachment (H01J 49/145 takes precedence)]

using surface ionisation, e.g. field-, thermonic- or photo-emission

[using photoionisation, e.g. by laser]

[Direct photo-ionisation, e.g. single photon or multi-photon ionisation]

[using photoionisation, e.g. by laser attachment]

[Cavillaries and nozzles specially adapted therefor; (electrostatic spraying per se B05B 5/00)]

[field ionisation, e.g. corona discharge (atmospheric pressure corona discharge per se H01T 19/00)]

using spark ionisation

Magnetic deflection

Electrostatic deflection

Vacuum systems, e.g. maintaining desired pressures

Mass spectrometers or separator tubes (isotope separation using these tubes B01D 59/44)

Static spectrometers

[using electrostatic analysers]

[using electrostatic and magnetic sectors with simple focusing, e.g. with parallel fields such as Aston spectrometer]

[with energy analysis, e.g. Castaing filter (in cathode-ray or electron-beam tubes H01J 29/84; electron-or ion-optical arrangements for separating electrons or ions from an analysing or processing beam H01J 37/05; micro- or spot-analysing tubes H01J 37/25)]
49/288 . . . . [using crossed electric and magnetic fields perpendicular to the beam, e.g. Wien filter]
49/30 . . . . using magnetic analysers {, e.g. Dempster spectrometer}
49/305 . . . . [with several sectors in tandem]
49/32 . . . . using double focusing
49/322 . . . . [with a magnetic sector of 90 degrees, e.g. Mattauch-Herzog type]
49/324 . . . . [with an electrostatic section of 90 degrees, e.g. Nier-Johnson type]
49/326 . . . . [with magnetic and electrostatic sectors of 90 degrees]
49/328 . . . . [with a cycloidal trajectory by using crossed electric and magnetic fields, e.g. trochoidal type]
49/34 . Dynamic spectrometers
49/36 . Radio frequency spectrometers, e.g. Bennett-type spectrometers, Redhead-type spectrometers
49/38 . . . . Omegatrons {Using ion cyclotron resonance}
49/40 . . . . Time-of-flight spectrometers (H01J 49/36 takes precedence)
49/401 . . . . [characterised by orthogonal acceleration, e.g. focusing or selecting the ions, pusher electrode]
49/403 . . . . [characterised by the acceleration optics and/or the extraction fields]
49/405 . . . . [characterised by the reflectron, e.g. curved field, electrode shapes]
49/406 . . . . [with multiple reflections (electrostatic traps H01J 49/4245)]
49/408 . . . . [with multiple changes of direction, e.g. by using electric or magnetic sectors, closed-loop time-of-flight]
49/42 . Stability-of-path spectrometers, e.g. monopole, quadrupole, multipole, farivitrons
49/4205 . . . . [Device types]
49/421 . . . . [Mass filters, i.e. deviating unwanted ions without trapping]
49/4215 . . . . [Quadrupole mass filters (H01J 49/4225 takes precedence)]
49/422 . . . . [Two-dimensional RF ion traps (ion guides without mass selection H01J 49/062)]
49/4225 . . . . [Multipole linear ion traps, e.g. quadrupoles, hexapoles]
49/423 . . . . [with radial ejection]
49/4235 . . . . [Stacked rings or stacked plates]
49/424 . . . . [Three-dimensional ion traps, i.e. comprising end-cap and ring electrodes]
49/4245 . . . . [Electrostatic ion traps (H01J 49/422 takes precedence; multi-reflection time of flight spectrometers H01J 49/406)]
49/425 . . . . [with a logarithmic radial electric potential, e.g. orbitraps]
49/4255 . . . . [with particular constructional features]
49/426 . . . . [Methods for controlling ions]
49/4265 . . . . [Controlling the number of trapped ions, preventing space charge effects]
49/427 . . . . [Ejection and selection methods]

49/4275 . . . . [Applying a non-resonant auxiliary oscillating voltage, e.g. parametric excitation]
49/428 . . . . . [Applying a notched broadband signal]
49/4285 . . . . [Applying a resonant signal, e.g. selective resonant ejection matching the secular frequency of ions (H01J 49/429, H01J 49/428 take precedence)]
49/429 . . . . [Scanning an electric parameter, e.g. voltage amplitude or frequency]
49/4295 . . . . [Storage methods]
49/44 . Energy spectrometers, e.g. alpha-, beta-spectrometers
49/443 . [Dynamic spectrometers]
49/446 . . [Time-of-flight spectrometers]
49/46 . Static spectrometers
49/465 . . [using static magnetic fields]
49/466 . . [using crossed electric and magnetic fields perpendicular to the beam, e.g. Wien filter (see also H01J 49/288)]
49/48 . . . . using electrostatic analysers, e.g. cylindrical sector, Wien filter
49/482 . . . . [with cylindrical mirrors]
49/484 . . . . [with spherical mirrors]
49/486 . . . . [with plane mirrors, i.e. uniform field]
49/488 . . . . [with retarding grids]

Discharge lamps

H01J

61/00 Gas- or vapour-discharge lamps (use for sterilising milk products A23C; use for medical purposes A61N 5/00; use for disinfecting water C02F; use for lighting P21; [use for advertising G09F] ; circuits therefor H05B; arc lamps with consumable electrodes H05B; electroluminescent lamps H05B)
61/02 . Details
61/025 . . [Associated optical elements]
61/04 . Electodes (for igniting H01J 61/54); Screens; Shields
61/045 . . . [Thermic screens or reflectors (heat-reflecting coatings on the wall of the vessel H01J 61/35)]
61/06 . Main electrodes
61/067 . . . . for low-pressure discharge lamps
61/0672 . . . . [characterised by the construction of the electrode]
61/0675 . . . . [characterised by the material of the electrode]
61/0677 . . . . [characterised by the electron emissive material]
61/073 . . . . for high-pressure discharge lamps
61/0732 . . . . [characterised by the construction of the electrode]
61/0735 . . . . [characterised by the material of the electrode]
61/0737 . . . . [characterised by the electron emissive material]
61/09 . . . . . . . . Hollow cathodes
61/10 . . . . . . . . Shields, screens, or guides for influencing the discharge
61/103 . . . . [Shields, screens or guides arranged to extend the discharge path (H01J 61/106 takes precedence)]
61/106 . . . . [using magnetic means]
Discharge lamps

61/12 . . . Selection of substances for gas fillings; Specified operating pressure or temperature
61/125 . . . [having an halogenide as principal component]
61/14 . . . having one or more carbon compounds as the principal constituents
61/16 . . . having helium, argon, neon, krypton, or xenon as the principle constituent
61/18 . . . mercury vapour
61/22 . . . vapour of an alkali metal
61/24 . . . Means for obtaining or maintaining the desired pressure within the vessel
61/26 . . . Means for absorbing or adsorbing gas, e.g. by gettering; Means for preventing blackening of the envelope
61/28 . . . Means for producing, introducing, or replenishing gas or vapour during operation of the lamp
61/30 . . . Vessels; Containers
61/302 . . . [characterised by the material of the vessel]
61/305 . . . [Flat vessels or containers]
61/307 . . . [with folded elongated discharge path]
61/32 . . . Special longitudinal shape, e.g. for advertising purposes (H01J 61/305 takes precedence)
61/322 . . . [Circular lamps]
61/325 . . . [U-shaped lamps]
61/327 . . . ["Compact"-lamps, i.e. lamps having a folded discharge path]
61/33 . . . Special shape of cross-section, e.g. for producing cool spot
61/34 . . . Double-wall vessels or containers
61/35 . . . provided with coatings on the walls thereof; Selection of materials for the coatings (using coloured coatings H01J 61/40; using luminescent coatings H01J 61/42)
61/36 . . . Seals between parts of vessels; Seals for leading-in conductors; Leading-in conductors
61/361 . . . [Seals between parts of vessel]
61/363 . . . [End-disc seals or plug seals]
61/365 . . . [Annular seals disposed between the ends of the vessel (H01J 61/363 takes precedence)]
61/366 . . . [Seals for leading-in conductors]
61/368 . . . [Pinched seals or analogous seals]
61/38 . . . Devices for influencing the colour or wavelength of the light
61/40 . . . by light filters; by coloured coatings in or on the envelope
61/42 . . . by transforming the wavelength of the light by luminescence
61/44 . . . Devices characterised by the luminescent material (luminescent materials C09K 11/00)
61/46 . . . Devices characterised by the binder or other non-luminescent constituent of the luminescent material, e.g. for obtaining desired pouring or drying properties
61/48 . . . Separate coatings of different luminous materials
61/50 . . . Auxiliary parts or solid material within the envelope for reducing risk of explosion upon breakage of the envelope, e.g. for use in mines
61/52 . . . Cooling arrangements; Heating arrangements; Means for circulating gas or vapour within the discharge space (heating or cooling arrangements to promote ionisation for starting H01J 61/541)
61/523 . . . [Heating or cooling particular parts of the lamp]
61/526 . . . [heating or cooling of electrodes]
61/54 . . . Igniting arrangements, e.g. promoting ionisation for starting (circuit arrangements H05B)
61/541 . . . [using a bimetal switch]
61/542 . . . [and an auxiliary electrode inside the vessel]
61/544 . . . [and an auxiliary electrode outside the vessel]
61/545 . . . [using an auxiliary electrode inside the vessel (H01J 61/542 takes precedence)]
61/547 . . . [using an auxiliary electrode outside the vessel (H01J 61/544 takes precedence)]
61/548 . . . [using radioactive means to promote ionisation]
61/56 . . . One or more circuit elements structurally associated with the lamp
61/58 . . . Lamps with both liquid anode and liquid cathode
61/60 . . . Lamps in which the discharge space is substantially filled with mercury before ignition
61/62 . . . Lamps with gaseous cathode, e.g. plasma cathode
61/64 . . . Cathode glow lamps (designed as tuning or voltage indicators H01J 17/40)
61/66 . . . having one or more specially shaped cathodes, e.g. for advertising purposes [alphanumeric]
61/68 . . . Lamps in which the main discharge is between parts of a current-carrying guide, e.g. halo lamp
61/70 . . . Lamps with low-pressure unconstricted discharge [having a cold pressure < 400 Torr]
61/72 . . . having a main light-emitting filling of easily vaporisable metal vapour, e.g. mercury
61/74 . . . having a main light-emitting filling of difficult vaporisable metal vapour, e.g. sodium
61/76 . . . having a filling of permanent gas or gases only
61/78 . . . with cold cathode; with cathode heated only by discharge, e.g. high-tension lamp for advertising
61/80 . . . Lamps suitable only for intermittent operation, e.g. flash lamp
61/82 . . . Lamps with high-pressure unconstricted discharge [having a cold pressure > 400 Torr]
61/822 . . . [High-pressure mercury lamps]
61/825 . . . [High-pressure sodium lamps]
61/827 . . . [Metal halide arc lamps]
61/84 . . . Lamps with discharge constricted by high pressure
61/86 . . . with discharge additionally constricted by close spacing of electrodes, e.g. for optical projection
61/88 . . . with discharge additionally constricted by envelope
61/90 . . . Lamps suitable only for intermittent operation, e.g. flash lamp
61/92 . . . Lamps with more than one main discharge path
61/94 . . . Paths producing light of different wavelengths, e.g. for simulating daylight
61/95 . . . Lamps with control electrode for varying intensity or wavelength of the light, e.g. for producing modulated light
61/96 . Lamps with light-emitting discharge path and separately-heated incandescent body within a common envelope, e.g. for simulating daylight
61/98 . Lamps with closely spaced electrodes heated to incandescence by light-emitting discharge, e.g. tungsten arc lamp

63/00 Cathode-ray or electron-stream lamps (flying-spot tubes H01J 31/10; magic-eye tuning indicators H01J 31/14; lamps with incandescent body heated by the ray or stream H01K) (see also H01J 29/00)
63/02 . Details, e.g. electrode, gas filling, shape of vessel
63/04 . . Vessels provided with luminescent coatings; Selection of materials for the coatings
63/06 . Lamps with luminescent screen excited by the ray or stream
63/08 . Lamps with gas plasma excited by the ray or stream

65/00 Lamps without any electrode inside the vessel; Lamps with at least one main electrode outside the vessel
65/04 . Lamps in which a gas filling is excited to luminesce by an external electromagnetic field or by external corpuscular radiation, e.g. for indicating plasma display panels
65/04 . . (by an external electromagnetic field)
65/04 . . . (the field being produced by a separate microwave unit)
65/04 . . . . (the field being produced by using capacitive means around the vessel)
65/04 . . . . . (the field being produced by using an excitation coil)
65/06 . Lamps in which a gas filling is excited to luminesce by radioactive material structurally associated with the lamp, e.g. inside the vessel
65/08 . Lamps in which a screen or coating is excited to luminesce by radioactive material located inside the vessel (direct conversion of radiation energy from radioactive sources into light G21H 30/02)

99/00 Subject matter not provided for in other groups of this subclass

2201/00 Electrodes common to discharge tubes
2201/02 . Arrangements for eliminating deleterious effects
2201/025 . . charging
2201/19 . Thermionic cathodes
2201/193 . Thin film cathodes
2201/196 . Emission assisted by other physical processes, e.g. field- or photo emission
2201/28 . Heaters for thermionic cathodes
2201/2803 . Characterised by the shape or size
2201/2807 . Block
2201/281 . Cage-like construction
2201/2814 . being a mesh-like network
2201/2817 . . . Rods
2201/2821 . . . Envelope or cross-section
2201/2825 . . . being oval or elliptic
2201/2828 . . . being rectangular or square
2201/2832 . . . being circular
2201/2835 . . . Folded
2201/2839 . . . Hair-pin or simple bend
2201/2842 . . . Conic

2201/2846 . . . Loop
2201/285 . . . Plurality of elements
2201/2853 . . . Serpentine
2201/2857 . . . being coiled
2201/286 . . . being looped
2201/2864 . . . Ribbon or bar
2201/2867 . . . Spiral or helix
2201/2871 . . . being flattened
2201/2875 . . . being double, reverse helix or interwoven
2201/2878 . . . Thin film or film-like
2201/2882 . . . Variable winding density
2201/2885 . . . Twisted
2201/2889 . . . Characterised by material
2201/2892 . . . Coatings
2201/2896 . . . Insulating layers
2201/30 . Cold cathodes
2201/304 . Field emission cathodes
2201/30403 . . . characterised by the emitter shape
2201/30407 . . . Microengineered point emitters
2201/30411 . . . conical shaped, e.g. Spindt type
2201/30415 . . . needle shaped
2201/30419 . . . Pillar shaped emitters
2201/30423 . . . Microengineered edge emitters
2201/30426 . . . Coatings on the emitter surface, e.g. with low work function materials
2201/3043 . . . Fibres
2201/30434 . . . Nanotubes
2201/30438 . . . Particles
2201/30442 . . . Whiskers
2201/30446 . . . characterised by the emitter material
2201/30449 . . . Metals and metal alloys
2201/30453 . . . Carbon types
2201/30457 . . . Diamond
2201/30461 . . . Graphite
2201/30465 . . . Fullerences
2201/30469 . . . Carbon nanotubes (CNTs)
2201/30473 . . . Amorphous carbon
2201/30476 . . . Diamond-like carbon [DLC]
2201/3048 . . . Semiconductor materials
2201/30484 . . . . Carbidex
2201/30488 . . . . Nitrides
2201/30492 . . . . Borides
2201/30496 . . . . Oxides
2201/30506 . . . Ferroelectric cathodes
2201/30508 . . . Semiconductor cathodes, e.g. having PN junction layers
2201/30512 . . . having an electric field perpendicular to the surface thereof
2201/30525 . . . Metal-insulator-Metal [MIM] emission type cathodes
2201/30516 . . . having an electric field parallel to the surface thereof, e.g. thin film cathodes
2201/30517 . . . Surface conduction emission type cathodes
2201/30517 . . . combined with other synergetic effects, e.g. secondary, photo- or thermal emission
2201/30519 . . . Circuit elements associated with the emitters by direct integration
2201/30519 . . . Resistive members, e.g. resistive layers
2201/3042 . Secondary emission electrodes
2201/30434 . Photoemissive electrodes
2201/30437 . . . Cathodes
2201/30437 . . . . Composition of the emitting surface
H01J 2203/00 Electron or ion optical arrangements common to discharge tubes or lamps

2203/02 . . . Electron guns
2203/0204 . using cold cathodes, e.g. field emission cathodes
2203/0208 . Control electrodes
2203/0212 . . . Gate electrodes
2203/0216 . . . characterised by the form or structure
2203/022 . . . Shapes or dimensions of gate openings
2203/0224 . Arrangement of gate openings
2203/0228 . . . Curved/ extending upwardly
2203/0232 . . . characterised by the material
2203/0236 . . . Relative position to the emitters, cathodes or substrates
2203/024 . . . Focusing electrodes
2203/0244 . . . characterised by the form or structure
2203/0248 . . . Shapes or dimensions of focusing electrode openings
2203/0252 . . . Arrangement of focusing electrode openings
2203/0256 . . . characterised by the material
2203/026 . . . Relative position to the gate electrodes, emitters, cathodes or substrates
2203/0264 . . . In the same plane as the gate electrodes or cathodes
2203/0268 . . . Insulation layer
2203/0272 . . . for gate electrodes
2203/0276 . . . for focusing electrodes
2203/028 . . . characterised by the shape
2203/0284 . . . Dimensions of openings
2203/0288 . . . characterised by the material
2203/0292 . . . Potentials applied to the electrodes
2203/0296 . . . Spin-polarised beams
2203/04 . . . Ion guns

H01J 2209/00 Apparatus and processes for manufacture of discharge tubes

2209/01 . . . Generalised techniques
2209/012 . . . Coating
2209/015 . . . Machines therefor
2209/017 . . . Cleaning
2209/02 . . . Manufacture of cathodes
2209/022 . . . Cold cathodes
2209/0223 . . . Field emission cathodes
2209/0226 . . . Sharpening or reshaping of emitting point or edge
2209/022 . . . Assembling together the component parts of the discharge tube
2209/0236 . . . Manufacture of magnetic deflecting devices
2209/02363 . . . Coils
2209/02366 . . . Machines therefor, e.g. winding, forming, welding, or the like
2209/026 . . . Sealing parts of the vessel to provide a vacuum enclosure
2209/0261 . . . Apparatus used for sealing vessels, e.g. furnaces, machines or the like
2209/2366 . . . Organo-metallic compounds, e.g. Ferrocene
2209/2363 . . . Machines therefor, e.g. electron gun assembling devices
2209/236 . . . Manufacture of magnetic deflecting devices
2209/2366 . . . Machines therefor, e.g. winding, forming, welding, or the like
2209/26 . . . Sealing parts of the vessel to provide a vacuum enclosure
2209/261 . . . Apparatus used for sealing vessels, e.g. furnaces, machines or the like

2209/262 . . . means for applying sealing materials, e.g. frit paste dispensers
2209/264 . . . Materials for sealing vessels, e.g. frit glass compounds, resins or structures
2209/265 . . . Surfaces for sealing vessels
2209/267 . . . shaped surfaces or flanges
2209/268 . . . treated surfaces and surface preparations, e.g. to improve adhesion
2209/38 . Control of maintenance of pressure in the vessel
2209/383 . . . Vacuum pumps
2209/385 . . . Gettering
2209/3855 . . . Getter materials
2209/387 . . . Gas filling
2209/389 . . . Degassing
2209/3893 . . . by a discharge
2209/3896 . . . by heating
2209/46 . . . Handling of tube components during manufacture
2209/463 . . . Identifying or selecting component pieces
2209/466 . . . Marking, e.g. bar-codes

2211/00 Plasma display panels with alternate current induction of the discharge, e.g. AC-PDPs (plasma display panels making use of direct current H01J 2211/00)

2211/10 . . . AC-PDPs with at least one main electrode being out of contact with the plasma
2211/12 . . . with main electrodes provided on both sides of the discharge space
2211/14 . . . with main electrodes provided only on one side of the discharge space
2211/16 . . . with main electrodes provided inside or on the side face of the spacers
2211/18 . . . containing a plurality of independent closed structures for containing the gas, e.g. plasma tube array [PTA] display panels
2211/20 . . . Constructional details
2211/22 . . . Electrodes
2211/225 . . . Material of electrodes
2211/24 . . . Sustain electrodes or scan electrodes
2211/245 . . . Shape, e.g. cross section or pattern
2211/26 . . . Address electrodes
2211/265 . . . Shape, e.g. cross section or pattern
2211/28 . . . Auxiliary electrodes, e.g. priming electrodes or trigger electrodes
2211/30 . . . Floating electrodes
2211/32 . . . Disposition of the electrodes
2211/323 . . . Mutual disposition of electrodes
2211/326 . . . Disposition of electrodes with respect to cell parameters (H01J 2211/323 takes precedence), e.g. electrodes within the ribs
2211/34 . . . Vessels, containers or parts thereof, e.g. substrates
2211/36 . . . Spacers, barriers, ribs, partitions or the like
2211/361 . . . characterized by the shape
2211/363 . . . Cross section of the spacers
2211/365 . . . Pattern of the spacers
2211/366 . . . characterized by the material
2211/368 . . . Dummy spacers, e.g. in a non display region
2211/38 . . . Dielectric or insulating layers
2211/40 . . . Layers for protecting or enhancing the electron emission, e.g. MgO layers
2211/42 . . . Fluorescent layers
2217/44 . . . Optical arrangements or shielding arrangements, e.g. filters or lenses
2217/442 . . . . Light reflecting means; Anti-reflection means
2217/444 . . . . Means for improving contrast or colour purity, e.g. black matrix or light shielding means
2217/446 . . . . Electromagnetic shielding means; Antistatic means
2217/448 . . . . Near infrared shielding means
2217/46 . . . Connecting or feeding means, e.g. leading-in conductors
2217/48 . . . Sealing, e.g. seals specially adapted for leading-in conductors
2217/50 . . . Filling, e.g. selection of gas mixture
2217/52 . . . Means for absorbing or adsorbing the gas mixture, e.g. by gettering
2217/54 . . . Means for exhausting the gas
2217/62 . . . Circuit arrangements (circuits or methods for driving PDP's G09G 3/28)
2217/66 . . . Cooling arrangements (cooling or supporting means not being part of the tube H05K)

2217/00 Gas-filled discharge tubes (H01J 2211/00 takes precedence)
2217/04 . . . Electrodes (for display panels not making use of alternating current H01J 2217/492; for discharge tubes in general H01J 2201/00)
2217/06 . . . Cathodes
2217/062 . . . thermionic
2217/065 . . . heated by the discharge
2217/067 . . . Cold cathodes
2217/10 . . . Anodes
2217/12 . . . Control electrodes
2217/38 . . . Cold-cathode tubes
2217/40 . . . Gas discharge switches
2217/402 . . . Multiple switches
2217/4025 . . . . for addressing electro-optical devices, i.e. LCD's
2217/404 . . . . Display panels, e.g. not making use of alternating current (H01J 2211/10 takes precedence)
2217/4041 . . . . characterised by problems peculiar to plasma displays
2217/40415 . . . . Luminosity
2217/4042 . . . . Details
2217/404207 . . . . Electrodes
2217/404214 . . . . Shape
2217/404221 . . . . Mutual disposition
2217/404228 . . . . Crossed electrodes
2217/404235 . . . . Side-by-side electrodes
2217/404242 . . . . Auxiliary electrodes
2217/40425 . . . . Mounting, supporting, spacing
2217/404257 . . . . Means for isolating electrodes from the discharge, e.g. dielectric layers
2217/404264 . . . . Vessels
2217/404271 . . . . Spacers between front and back panels
2217/404278 . . . . Coatings (H01J 2217/49292 takes precedence)
2217/404285 . . . . Associated optical means (combined with electromagnetic screens H01J 2217/49292)
2217/404292 . . . . Filters
2217/4049 . . . . A.C. panels
2217/40498 . . . . Hybrid panels (AC and DC)

2221/00 Details of transit-time tubes of the types covered by group H01J 2225/00
2221/005 . . . Cooling methods or arrangements
2221/02 . . . Electrodes; Magnetic control means; Screens
2221/027 . . . Collectors
2221/0275 . . . Multistage collectors
2221/033 . . . Collector cooling devices
2221/04 . . . Cathodes
2221/05 . . . . having a cylindrical emissive surface, e.g. cathodes for magnetrons
2221/06 . . . Electron or ion guns
2221/065 . . . producing a solid cylindrical beam
2221/07 . . . producing a hollow cylindrical beam
2221/075 . . . Magnetron injection guns
2221/08 . . . Focusing arrangements, e.g. for concentrating stream of electrons, for preventing spreading of stream
2221/083 . . . Electrostatic focusing arrangements
2221/087 . . . Magnetic focusing arrangements
2221/0873 . . . . with at least one axial-field reversal along the interaction space, e.g. P.P.M. focusing
2221/0876 . . . . with arrangements improving the linearity and homogeneity of the axial field, e.g. field straightener
2221/09 . . . Electric system for directing or deflecting the discharge along a desired path, e.g. E-type
2221/10 . . . Magnet systems for directing or deflecting the discharge along a desired path, e.g. a spiral path
2221/11 . . . Means for reducing noise
2221/12 . . . Vessels; Containers
2221/14 . . . Leading-in arrangements; Seals therefor
2221/15 . . . Means for preventing wave energy leakage structurally associated with tube leading-in arrangements, e.g. filters, chokes, attenuating devices
2221/16 . . . Circuit elements, having distributed capacitance and inductance, structurally associated with the tube and interacting with the discharge
2221/165 . . . Manufacturing processes or apparatus therefore
2221/18 . . . Resonators
2221/20 . . . Cavity resonators; Adjustment or tuning thereof
2221/207 . . . . Tuning of single resonator
2221/213 . . . . . Simultaneous tuning of more than one resonator, e.g. resonant cavities of a magnetron
2221/22 . . . Connections between resonators, e.g. strapping for connecting resonators of a magnetron
2221/24 . . . Slow-wave structures, e.g. delay systems
2221/26 . . . Helical slow-wave structures; Adjustment thereof
2221/27 . . . . Helix-derived slow-wave structures
2221/28 . . . . Interdigital slow-wave structures; Adjustment thereof
2221/30 . . . . Damping arrangements associated with slow-wave structures, e.g. for suppression of unwanted oscillations
2221/34 . . . Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for
2221/36 . . . Coupling devices having distributed capacitance and inductance, structurally associated with the tube, for introducing or removing wave energy
2221/38 . . . . to or from the discharge
2225/00 Transit-time tubes, e.g. Klystrons, travelling-wave tubes, magnetrons

2225/005 . . . Gas-filled transit-time tubes
2225/02 . . . Tubes with electron stream modulated in velocity or density in a modulator zone and thereafter giving up energy in an inducing zone, the zones being associated with one or more resonators
2225/025 . . . with an electron stream following a helical path
2225/04 . . . Tubes having one or more resonators, without reflection of the electron stream, and in which the modulation produced in the modulator zone is mainly density modulation, e.g. Heaff tube
2225/06 . . . Tubes having only one resonator, without reflection of the electron stream, and in which the modulation produced in the modulator zone is mainly velocity modulation, e.g. Lüdi-Klystron
2225/08 . . . with electron stream perpendicular to the axis of the resonator
2225/10 . . . Klystrons, i.e. tubes having two or more resonators, without reflection of the electron stream, and in which the stream is modulated mainly by velocity in the zone of the input resonator
2225/11 . . . Extended interaction Klystrons
2225/12 . . . with pencil-like electron stream in the axis of the resonators
2225/14 . . . with tube-like electron stream coaxial with the axis of the resonators
2225/16 . . . with pencil-like electron stream perpendicular to the axis of the resonators
2225/18 . . . with radial or disc-like electron stream perpendicular to the axis of the resonators
2225/20 . . . having special arrangements in the space between resonators, e.g. resistive-wall amplifier tube, space-charge amplifier tube, velocity-jump tube
2225/22 . . . Reflex Klystrons, i.e. tubes having one or more resonators, with a single reflection of the electron stream, and in which the stream is modulated mainly by velocity in the modulator zone
2225/24 . . . in which the electron stream is in the axis of the resonator or resonators and is pencil-like before reflection
2225/26 . . . in which the electron stream is coaxial with the axis of the resonator or resonators and is tube-like before reflection
2225/28 . . . in which the electron stream is perpendicular to the axis of the resonator or resonators and is pencil-like before reflection

2225/30 . . . in which the electron stream is perpendicular to the axis of the resonator or resonators and is radial or disc-like before reflection
2225/32 . . . Tubes with plural reflection, e.g. Coeterier tube
2225/34 . . . Travelling-wave tubes; Tubes in which a travelling wave is simulated at spaced gaps
2225/36 . . . Tubes in which an electron stream interacts with a wave travelling along a delay line or equivalent sequence of impedance elements, and without magnet system producing an H-field crossing the E-field
2225/38 . . . the forward travelling wave being utilised
2225/40 . . . the backward travelling wave being utilised
2225/42 . . . Tubes in which an electron stream interacts with a wave travelling along a delay line or equivalent sequence of impedance elements, and with a magnet system producing an H-field crossing the E-field
2225/44 . . . the forward travelling wave being utilised
2225/46 . . . the backward travelling wave being utilised
2225/48 . . . Tubes in which two electron streams of different velocities interact with one another, e.g. electron-wave tube
2225/49 . . . Tubes using the parametric principle, e.g. for parametric amplification
2225/50 . . . Magnetrons, i.e. tubes with a magnet system producing an H-field crossing the E-field
2225/52 . . . with an electron space having a shape that does not prevent any electron from moving completely around the cathode or guide electrode
2225/54 . . . having only one cavity or other resonator, e.g. neutrode tube
2225/55 . . . . . . Coaxial cavity magnetrons
2225/56 . . . . . . with interdigital arrangements of anodes, e.g. turbator tube
2225/58 . . . . . . having a number of resonators; having a composite resonator, e.g. a helix
2225/59 . . . . . . . Multi-cavity magnetrons
2225/593 . . . . . . . Rising-sun magnetrons
2225/60 . . . . . . with an electron space having a shape that prevents any electron from moving completely around the cathode or guide electrode; Linear magnetrons
2225/61 . . . . . . Hybrid tubes, i.e. tubes comprising a klystron section and a travelling-wave section
2225/62 . . . . . . Strophotrons, i.e. tubes with H-field crossing the E-field and functioning with plural reflection
2225/64 . . . . . . Turbine tubes, i.e. tubes with H-field crossing the E-field and functioning with reversed cyclotron action
2225/66 . . . . . . Tubes with electron stream crossing itself and thereby interacting or interfering with itself
2225/68 . . . . . . Tubes specially designed to act as oscillator with positive grid and retarding field, e.g. for Barkhausen-Kurz oscillators
2225/70 . . . . . . with resonator having distributed inductance with capacitance, e.g. Pintsch tube
2225/72 . . . . . . in which a standing wave or a considerable part thereof is produced along an electrode, e.g. Clavier tube
2225/74 . . . . . . Tubes specially designed to act as transit-time diode oscillators, e.g. monotron
2225/76 . . . . . . Dynamic electron-multiplier tubes, e.g. Farnsworth multiplier tube, multipactor
Details of cathode ray tubes or electron beam tubes
(H01J 2329/00 takes precedence)

- Tubes with electron stream modulated by deflection in a resonator
- Elimination of unwanted or stray electromagnetic effects
- Preventing or cancelling fields leaving the enclosure
- Passive means
- Preventing or cancelling fields entering the enclosure
- Active means
- Preventing or cancelling fields within the enclosure
- Demagnetisation
- Cooling arrangements
- Active means, e.g. fluid flow
- Applied to the faceplate
- Translucent coolant, e.g. flowing across faceplate
- Passive means, e.g. fins, heat conductors
- Shadow masks
- Mounting arrangement of assembly to vessel
- Spring and plate (clip) type
- Mounting arrangements of aperture plate to frame or vessel
- Frame
- Aperture plate
- Characterised by the material
- Mitigating undesirable mechanical effects
- Vibrations
- Beam passing apertures, e.g. geometrical arrangements
- Characterised by aperture shape
- Uniaxial masks having parallel slit apertures, i.e. Trinitron type
- Details of skirt or border
- Apertures, cut-outs, depressions, or the like
- Coatings
- Improving thermal radiation properties
- Parameterised dimensions of aperture plate, e.g. relationships, polynomial expressions
- Geometrical arrangements, e.g. curvature
- Phosphor screens
- Multi-layer
- Geometrical arrangement of phosphors
- Electron guns
- Electrodes
- Shield centering cups
- Focusing electrodes
- Pre-focusing
- Accelerating electrodes
- Extraction grids
- Constructional arrangements of electrodes
- Electrodes formed on surface of common cylindrical support
- Electrode supports
- Electrical arrangements coupled to electrodes, e.g. potentials
- Characterised by the potentials applied
- Dynamic potentials
- Characterised by beam passing apertures or combinations
- Aperture shape as viewed along beam axis
- Trapezoidal
- With rounded end or ends
- Parallelogram
- Square
- Rectangle
- With rounded end or ends
- Circular
- Oval
- Non-symmetrical about line scanning axis
- Non-symmetrical about field scanning axis
- Polygonal
- Cross shaped
- Interconnected apertures
- Complex and not provided for
- Plurality of guns or beams
- Three beam guns, e.g. for colour CRTs
- Arrays
- Multi-beam groups, e.g. number of beams greater than number of cathodes
- Correction of beam optics
- Aberrations by type
- Spherical
- Astigmatism
- Colour purity
- Using supplementary correction devices
- Magnetic
- Permanently magnetised materials, e.g. permanent magnets
- Magnetic materials, e.g. soft iron
- Cross-arms field shaper
- Auxiliary coils
- Velocity modulation
- Electron beam control inside the vessel
- By magnetic means
- By electrostatic means
- At the source
- Cooperating with the electron gun
- At the screen
- Between the source and the screen
- Electron beam control outside the vessel
- By magnetic fields
- Cores for field producing elements, e.g. ferrite
- Conductor design and distribution
- Winding
- Wires and conductors
- Form of conductor
- Flat, e.g. foil, or ribbon type
- Coil separators and formers
- Vessels and containers
- Neck or cone portions of the CRT vessel
- Characterised by the shape
- Non circular cross-sections
- Faceplates
- Characterised by shape
- Parameterised shape, e.g. expression, relationship or equation
- Substrates
- Frames
- Passive shielding means associated with the vessel
2229/8631 . . Coatings
2229/8632 . . characterised by the material
2229/8633 . . Meshes and patterns
2229/8634 . . Magnetic shielding
2229/8635 . . Antistatic shielding
2229/8636 . . Electromagnetic shielding
2229/8637 . . Mechanical shielding, e.g. against water or abrasion
2229/8638 . . Ionising radiation shielding, e.g. X-rays
2229/88 . . Means for avoiding vessel implosion
2229/875 . . Means substantially covering the output face, e.g. resin layers, protective panels
2229/88 . . Coatings
2229/882 . . having particular electrical resistive or conductive properties
2229/885 . . having particular electrical insulation properties
2229/887 . . having particular X-ray shielding properties
2229/89 . . Optical components associated with the vessel
2229/8901 . . Fixing of optical components to the vessel
2229/8903 . . Fibre optic components
2229/8905 . . Direction sensitive devices for controlled viewing angle
2229/8907 . . Image projection devices
2229/8909 . . Baffles, shutters, apertures or the like against external light
2229/8911 . . Large-scale devices, e.g. foldable screens
2229/8913 . . Anti-reflection, anti-glare, viewing angle and contrast improving treatments or devices
2229/8915 . . Surface treatment of vessel or device, e.g. controlled surface roughness
2229/8916 . . inside the vessel
2229/8918 . . by using interference effects
2229/892 . . Effect varying over surface
2229/8922 . . Apparatus attached to vessel and not integral therewith
2229/8924 . . having particular properties for protecting the vessel, e.g. against abrasion, water or shock
2229/8926 . . Active components, e.g. LCD's, indicators, illuminators and moving devices
2229/8928 . . Laser CRTs
2229/893 . . using lenses
2229/899 . . Photographic devices (permanent recording of images)
2229/92 . . Means providing or assisting electrical connection with or within the tube
2229/922 . . within the tube
2229/925 . . associated with the high tension [HT], e.g. anode potentials
2229/927 . . associated with digital scanning
2229/94 . . Means for obtaining or maintaining the desired pressure within the tube
2229/96 . . Circuit elements other than coils, reactors or the like, associated with the tube
2229/962 . . associated with the HT
2229/964 . . associated with the deflection system
2229/966 . . associated with the gun structure
2229/968 . . Resistors

2231/00 Cathode ray tubes or electron beam tubes

2231/12 . . CRTs having luminescent screens
2231/121 . . Means for indicating the position of the beam, e.g. beam indexing
2231/123 . . by direct current detection, e.g. collecting electrodes
2231/125 . . with a plurality of electron guns within the tube envelope
2231/1255 . . two or more neck portions containing one or more guns
2231/50 . . Imaging and conversion tubes
2231/50005 . . characterised by form of illumination
2231/5001 . . Photons
2231/50015 . . . . . . . Light
2231/50021 . . . . . . . Ultra-violet
2231/50026 . . . . . . . Infra-red
2231/50031 . . . . . . . High energy photons
2231/50036 . . . . . . . X-rays
2231/50042 . . . . . . . Particles
2231/50047 . . . . . . . Charged particles
2231/50052 . . . . . . . Mechanical vibrations, e.g. sound
2231/50057 . . . . . . . characterised by form of output stage
2231/50063 . . . . . . . Optical
2231/50068 . . . . . . . Electrical
2231/50073 . . . . . . . Charge coupled device [CCD]
2231/50078 . . . . . . . Resistive anode
2231/50084 . . . . . . . using light or electron beam scanning
2231/50089 . . . . . . . Having optical stage before electrical conversion
2231/50094 . . . . . . . Charge coupled device [CCD]
2231/501 . . including multiplication stage
2231/5013 . . with secondary emission electrodes
2231/5016 . . . . . . . Micropoint channel plates [MCP]
2231/503 . . with scanning or gating optics
2231/5033 . . . . . . . electrostatic
2231/5036 . . . . . . . magnetic
2231/505 . . . . . . . with non-scanning optics
2231/5053 . . . . . . . electrostatic
2231/5056 . . . . . . . magnetic

2235/00 X-ray tubes
2235/02 . . Electrical arrangements
2235/023 . . Connecting of signals or tensions to or through the vessel
2235/0233 . . . . . . . High tension
2235/0236 . . . . . . . Indirect coupling, e.g. capacitive or inductive
2235/026 . . Cathode assembly
2235/062 . . Cold cathodes
2235/064 . . Movement of cathode
2235/066 . . Rotation
2235/068 . . Multi-cathode assembly
2235/08 . . Targets (anodes) and X-ray converters
2235/081 . . Target material
2235/082 . . . . . . . Fluids, e.g. liquids, gases
2235/083 . . Bonding or fixing with the support or substrate
2235/084 . . Target-substrate interlayers or structures, e.g. to control or prevent diffusion or improve adhesion
2235/085 . . Target treatment, e.g. ageing, heating
2235/086 . . Target geometry
2235/088 . . Laminated targets, e.g. plurality of emitting layers of unique or differing materials
2235/10 . . Drive means for anode (target) substrate
2235/1006 . . Supports or shafts for target or substrate
2235/1013 . . Fixing to the target or substrate
2235/102 . . Materials for the shaft
1. For features of general interest which may be found in other types of discharge tubes, an indexing code corresponding to general schemes H01J 2201/00 - H01J 2203/00 is given, e.g. for cathodes, vessels, cooling means or the like

2. Same rules apply for manufacturing procedures (H01J 2209/00), unless really specific to the tube concerned.

3. The codes in this main group are grouped according to the following principle:
   - details common to gas or plasma discharge of the above mentioned tubes: H01J 2237/00 - H01J 2237/2487
   - Imaging or analysing: H01J 2237/25 - H01J 2237/2857
   - particle beam processing: H01J 2237/30 - H01J 2237/31798
   - plasma processing: H01J 2237/32 - H01J 2237/339

   Details of gas supplies, e.g. in an ion source, to take precedence; environmental cells for electron microscopes H01J 2237/303; microscopes with environmental specimen chamber H01J 2237/2608

2. Details

2. Charge control of objects or beams

2. Neutralising arrangements

2. Deflection of neutralising particles

2. of objects being observed or treated

2. using secondary electrons

2. using electromagnetic radiations, e.g. UV, X-rays, light

2. Charging arrangements

2. Details of gas supplies, e.g. in an ion source, to a beam line, to a specimen or to a workpiece, (H01J 2237/3244 takes precedence; environmental cells for electron microscopes H01J 2237/303; microscopes with environmental specimen chamber H01J 2237/2608)

2. Details

2. Protection arrangements

2. Extinguishing, preventing or controlling unwanted discharges

2. Avoiding or diminishing effects of eddy currents

2. Avoiding deleterious effects due to interactions between particles and tube elements

2. Means for avoiding or correcting vibration effects

2. Avoiding or removing foreign or contaminating particles, debris or deposits on sample or tube

2. Detecting or monitoring foreign particles

2. Moving components not otherwise provided for (diaphragms H01J 2237/0458; objects H01J 2237/202)

2. Moving whole optical system relatively to object

2. Shields

2. electrostatic

2. magnetic

2. electromagnetic

2. Liner tubes

2. Particle traps

2. Mounting, supporting, spacing or insulating electrodes

2. Mounting or supporting

2. Spacing

2. Insulating

2. Means for controlling the discharge

2. Beam polarising means

2. Beam blanking

2. High speed and short duration

2. Multi-aperture
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<th>CPC Code</th>
<th>Description</th>
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<td>Tilting or rocking beam around an axis substantially at an angle to optical axis</td>
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</table>
Detection characterised by the variable being measured

- Intensity, dose or other characteristics of particle beams or electromagnetic radiation (H01J 2237/24507)
- Beam diagnostics including control of the parameter or property diagnosed (H01J 2237/30472 takes precedence) (H01J 2237/24514)
- Beam diameter (H01J 2237/24521)
- Direction of beam or parts thereof in view of the optical axis, e.g. beam angle, angular distribution, beam divergence, beam convergence or beam landing angle on sample or workpiece (means for deflecting or directing discharge) (H01J 2237/24528)
- Beam current (H01J 2237/24535)
- Beam profile (H01J 2237/24542)
- Polarisation (electromagnetic beams) (H01J 2237/24555)
- Spin polarisation (particles) (H01J 2237/24557)
- Measurements of electric or magnetic variables, e.g. voltage, current, frequency (H01J 2237/24564)
- Measurements of non-electric or non-magnetic variables (H01J 2237/24571)
- Spatial variables, e.g. position, distance (H01J 2237/24578)
- Other variables, e.g. energy, mass, velocity, time, temperature (H01J 2237/24585)
- Inspection and quality control of devices (H01J 2237/24592)
- Components associated with the control of the tube (H01J 2237/24596)
- Optical means (H01J 2237/24598)
- Electric or electronic means (H01J 2237/2485)
- Electric or electronic means (H01J 2237/2487)
- using digital signal processors (H01J 2237/2488)
- Tubes for localised analysis using electron or ion beams (H01J 2237/2488)
- characterised by their application (H01J 2237/2505)
- Auger spectrometers (H01J 2237/2511)
- Secondary particles mass or energy spectrometry (H01J 2237/2516)
- Measuring electric fields or potentials (H01J 2237/2522)
- of electrons (ESCA, XPS) (H01J 2237/2527)
- Ions [SIMS] (H01J 2237/2533)
- Neutrals [SNMS] (H01J 2237/2538)
- Low energy electron microscopy [LEEM] (H01J 2237/2544)
- Diffraction [LEED] (H01J 2237/2555)
- Reflection diffraction [RHEED] (H01J 2237/2555)
- Microprobes, i.e. particle-induced X-ray spectrometry (H01J 2237/2555)
- electron (H01J 2237/2555)
- ion (H01J 2237/2555)
- proton (H01J 2237/2555)
- atomic (H01J 2237/2555)
- using tunnel effects, e.g. STM, AFM (H01J 2237/2583)
- Lorentz microscopy (magnetic field measurement) (H01J 2237/2588)
- Measuring electric fields or potentials (H01J 2237/2594)
- Electron or ion microscopes (H01J 2237/2596)
- Details (H01J 2237/2602)
- operating at elevated pressures, e.g. atmosphere (H01J 2237/2605)
- with environmental specimen chamber (environmental cells) (H01J 2237/2608)
- Stereoscopic measurements and/or imaging (H01J 2237/2611)
- Holography or phase contrast, phase related imaging in general, e.g. phase plates (H01J 2237/2614)
- Comparison or superposition of transmission images; Moiré (H01J 2237/2617)
- Non-scanning techniques (H01J 2237/262)
- Field-emission microscopes (H01J 2237/2623)
- Pulsed source (H01J 2237/2626)
Electron or ion beam tubes for processing objects

Processing objects on a macro-scale

Controlling tubes

Electron or ion optical systems

Emission microscopes

Scanning microscopes

Transmission microscopes

characterised by the imaging method

Scattered primary beam

Elastic scattering

Secondary charged particle

X-rays

Cathodoluminescence

characterised by the imaging problems involved

Bottom of trenches or holes

Large objects

Emission microscopes

characterised by the application

Measurement of surface topography

Depth profile

Length

Particle bombardment induced emission

Electron or ion beam tubes for processing objects

Electron or ion optical systems

Controlling tubes

Calibration grids

Calibration (for object processing apparatus H01J 2237/30483)

Emission microscopes

Auto-emission (i.e. field-emission)

Photo-emission

Particle bombardment induced emission

Electron or ion beam tubes for processing objects

Electron or ion optical systems

Controlling tubes

Details

using digital signal processors [DSP]

Handling of data (for lithography H01J 37/3174)

Data compression

using neural networks or fuzzy logic

System calibration (for microscopes H01J 2237/2826)

Registration

Calibration grids

Deflection calibration (deflecting in general H01J 2237/15: specific to material treating H01J 2237/30483)

Correction during exposure

pre-calculated

Detecting endpoint of process (for plasma apparatus H01J 37/32963, for sputtering apparatus H01J 37/3479)

Controlling the beam

Beam diameter

Scanning

Raster scan

Vector scan

Processing objects on a macro-scale

Welding

Cutting

Machining

Drilling

Casting

Melting

Evaporating

Plasma-assisted co-operation

Ion plating

Ion beam bombardment sputtering

Etching

Curing

Changing physical properties

Changing chemical properties

Processing objects on a microscale

Ion implantation

Dosimetry

Impurity or contaminant control

characterised by the area treated

unpatterned

patterned

using mask

Focused ion beam

Depositing thin layers on selected microareas

(ion plating H01J 2237/3142)

using STM

Direct-write microstructures

using ions

using STM

Etching microareas

for repairing masks

introducing gas in vicinity of workpiece

for preparing specimen to be viewed in microscopes or analyzed in microanalysers

using STM

Focused ion beam

Lithography

using particular beams or near-field effects, e.g. STM-like techniques

using electron beams

using ion beams

hybrid, i.e. charged particles and light, X-rays, plasma

using near-field effects, e.g. STM

Patterning strategy

Computer and memory organisation

Dividing into sub-patterns

Continuous moving of wafer

Step and repeat

Proximity effect correction

using multiple exposure

Flooding beam

Multi-beam

Shaped beam

by projection

from patterned photocathode

from patterned cold cathode

M-I-M cathode

Semiconductor cathode

Field-emitting cathode

through mask

Reflection mask

Scattering mask

Problems associated with lithography

affecting masks

affecting resists

detecting pattern defects (with SEM H01J 2237/2817; correcting H01J 2237/3175, H01J 2237/3174)
2237/32 . . . Processing objects by plasma generation
2237/327 . . . Arrangements for generating the plasma
2237/33 . . . characterised by the type of processing
2237/332 . . . Coating
2237/3321 . . . CVD [Chemical Vapor Deposition]
2237/3322 . . . Problems associated with coating
2237/3323 . . . uniformity
2237/3325 . . . large area
2237/3326 . . . high speed
2237/3327 . . . Coating high aspect ratio workpieces
2237/3328 . . . adhesion, stress, lift-off of deposited films
2237/334 . . . Etching
2237/3341 . . . Reactive etching
2237/3342 . . . Resist stripping
2237/3343 . . . Problems associated with etching
2237/3344 . . . isotropy
2237/3345 . . . anisotropy
2237/3346 . . . Selectivity
2237/3347 . . . bottom of holes or trenches
2237/3348 . . . control of ion bombardment energy
2237/335 . . . Cleaning
2237/3355 . . . Holes or apertures, i.e. inprinted circuit boards
2237/336 . . . Changing physical properties of treated surfaces
2237/3365 . . . Plasma source implantation
2237/338 . . . Changing chemical properties of treated surfaces
2237/3382 . . . Polymerising
2237/3385 . . . Carburising
2237/3387 . . . Nitriding
2237/339 . . . Synthesising components

Details

2261/00 Gas-or-vapour-discharge lamps
2261/02 . . . Details
2261/38 . . . Devices for influencing the colour or wavelength of the light
2261/385 . . . Non-chemical aspects of luminescent layers, e.g. thickness profile, shape and distribution of luminescent coatings

2329/00 Electron emission display panels, e.g. field emission display panels
2329/002 . . . Cooling means
2329/005 . . . Multi-directional displaying, i.e. with multiple display faces facing in different directions
2329/007 . . . Vacuumless display panels, i.e. with phosphor directly applied to emitter without intermediate vacuum space
2329/002 . . . Electrodes other than control electrodes
2329/004 . . . Cathode electrodes
2329/0402 . . . Thermionic cathodes
2329/0405 . . . Cold cathodes other than those covered by H01J 2329/0407 - H01J 2329/0492
2329/0407 . . . Field emission cathodes
2329/041 . . . characterised by the emitter shape
2329/0413 . . . Microengineered point emitters
2329/0415 . . . conical shaped, e.g. Spindt type
2329/0418 . . . needle shaped
2329/0421 . . . Pillar shaped emitters
2329/0423 . . . Microengineered edge emitters
2329/0426 . . . Coatings on the emitter surface, e.g. with low work function materials
2329/0428 . . . Fibres
2329/0431 . . . Nanotubes
2329/0434 . . . Particles
2329/0436 . . . Whiskers
2329/0439 . . . characterised by the emitter material
2329/0442 . . . Metals or metal alloys
2329/0444 . . . Carbon types
2329/0447 . . . Diamond
2329/0449 . . . Graphite
2329/0452 . . . Fullerenes
2329/0455 . . . Carbon nanotubes (CNTs)
2329/0457 . . . Amorphous carbon
2329/046 . . . Diamond-like carbon [DLC]
2329/0463 . . . Semiconductor materials
2329/0465 . . . Carbides
2329/0468 . . . Nitrides
2329/0471 . . . Borides
2329/0473 . . . Oxides
2329/0476 . . . Ferroelectric cathodes
2329/0478 . . . Semiconductor cathodes, e.g. having PN junction layers
2329/0481 . . . Cold cathodes having an electric field perpendicular to the surface thereof (H01J 2329/0478 take precedence)
2329/0484 . . . Metal-Insulator-Metal [MIM] emission type cathodes
2329/0486 . . . Cold cathodes having an electric field parallel to the surface thereof, e.g. thin film cathodes
2329/0489 . . . Surface conduction emission type cathodes
2329/0492 . . . Cold cathodes combined with other synergetic effects, e.g. secondary, photo- or thermal emission
2329/0494 . . . Circuit elements associated with the emitters by direct integration
2329/0497 . . . Resistive members, e.g. resistive layers
2329/08 . . . Anode electrodes
2329/18 . . . Luminescent screens
2329/20 . . . characterised by the luminescent material
2329/22 . . . characterised by the binder or adhesive for securing the luminescent material to its support, e.g. substrate
2329/28 . . . with protective, conductive or reflective layers
2329/30 . . . Shape or geometrical arrangement of the luminescent material
2329/32 . . . Means associated with discontinuous arrangements of the luminescent material
2329/323 . . . Black matrix
2329/326 . . . Color filters structurally combined with the luminescent material
2329/46 . . . Arrangements of electrodes and associated parts for generating or controlling the electron beams
2329/4604 . . . Control electrodes
2329/4608 . . . Gate electrodes
2329/4613 . . . characterised by the form or structure
2329/4617 . . . Shapes or dimensions of gate openings
2329/4621 . . . Arrangement of gate openings
2329/4626 . . . Curved or extending upwardly
2329/463 . . . characterised by the material
2329/4634 . . . Relative position to the emitters, cathodes or substrates
Circuit elements structurally associated with the vacuum within the vessel takes precedence.

Means for maintaining vacuum within the vessel:

- 2893/00: Electrodes and electrode systems suitable for discharge tubes or lamps
- 2893/01: Construction arrangements of electrode systems
- 2893/003: Anodes forming part of vessel walls
- 2893/004: Anodes formed in central part
- 2893/005: Fixing of electrodes
- 2893/006: Mounting
- 2893/007: Machines for assembly
- 2893/008: Supply leads; Electrode supports via rigid connection to vessel

Means for exhausting the vessel or maintaining vacuum:

- 2893/009: Electrode system pressing against vessel wall
- 2893/011: Non-constructive schematic arrangements
- 2893/012: Constructional arrangements
- 2893/013: Sealed electrodes
- 2893/015: Non-sealed electrodes
- 2893/016: Planar grids
- 2893/017: Cylindrical, helical or annular grids
- 2893/018: Bar or cage-like grids
- 2893/019: Chemical composition and manufacture
- 2893/002: Chemical
- 2893/021: Carbon
- 2893/022: Manufacture
- 2893/023: Carbonising and other surface treatments
- 2893/024: Planar grids
- 2893/025: By winding wire upon a support
- 2893/026: Machines for manufacture of grids or anodes
- 2893/027: Mitigation of temperature effects
- 2893/029: Electron beam tubes
- 2893/03: Tubes with plural electrode systems
- 2893/031: Tubes with material luminescing under electron bombardment
- 2893/032: Tubes with variable amplification factor
- 2893/033: Vacuum connection techniques applicable to discharge tubes and lamps
- 2893/034: Lamp bases
- 2893/035: Shaped as flat plates, in particular metallic
- 2893/036: Having wires, ribbons or tubes placed between two vessel walls and being perpendicular to at least one of said walls
- 2893/037: Solid sealing members other than lamp bases
- 2893/038: Direct connection between two insulating elements, in particular via glass material
- 2893/039: Glass-to-glass connection, e.g. by soldering
- 2893/04: Quartz-to-quartz connection
- 2893/041: Direct connection between insulating and metal elements, in particular via glass material
- 2893/043: Glass-to-metal or quartz-to-metal, e.g. by soldering
- 2893/044: Direct connection between two metal elements, in particular via material a connecting material
- 2893/045: Non-solid connections, e.g. liquid or rubber
- 2893/046: Lamp base with closure
- 2893/047: Closure other than lamp base
- 2893/048: Tubes with a main cathode
- 2893/049: Internal parts
- 2893/05: Cathodes
- 2893/051: Anode assemblies; screens for influencing the discharge
- 2893/052: Anode supporting means
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