G01T  MEASUREMENT OF NUCLEAR OR X-RADIATION (radiation analysis of materials, mass spectrometry G01N; counters per se G06M, H03K; electric discharge tubes for analysing radiation or particles H01J 40/00, H01J 47/00, H01J 49/00)

NOTES
1. This subclass covers the measurement of X-radiation, gamma radiation, corpuscular radiation, cosmic radiation or neutron radiation.
2. Attention is drawn to the Notes following the title of class G01.

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.

1/00 Measuring X-radiation, gamma radiation, corpuscular radiation, or cosmic radiation (G01T 3/00, G01T 5/00 take precedence)
1/003 . [Scintillation (flow) cells]
1/006 . [Total absorption calorimeters; Shower detectors]
1/02 . Dosimeters (G01T 1/15 takes precedence, measuring exposure time to X-rays H05G 1/28)
1/023 . . [Scintillation dose-rate meters]
1/026 . . [Semiconductor dose-rate meters]
1/04 . . Chemical dosimeters (G01T 1/06, G01T 1/08 take precedence)
1/06 . . Glass dosimeters (using colour change; including plastic dosimeters)
1/08 . . Photographic dosimeters (sensitive materials, processing thereof G03C; {photometry G01J 1/52})
1/10 . . Luminescent dosimeters
1/105 . . . Read-out devices (G01T 1/115 takes precedence)
1/11 . . . . Thermo-luminescent dosimeters (thermo-luminescent compositions C09K 11/00)
1/115 . . . . Read-out devices
1/12 . . . . Calorimetric dosimeters
1/14 . . . . Electrostatic dosimeters (construction of ionisation chambers H01J 47/02; {electrometers G01R 5/28})
1/142 . . . . Charging devices; Read-out devices
1/15 . . Instruments in which pulses generated by a radiation detector are integrated, e.g, by a diode pump circuit (pulse rate meters in general G01R 23/02)
1/16 . . Measuring radiation intensity (G01T 1/29 takes precedence; self-powered detectors G01T 3/006; using an ionisation chamber filled with a liquid or solid, e.g. frozen liquid, dielectric G01T 3/008)
1/1603 . . {[with a combination of at least two different types of detector (see provisionally also G01T 1/16)}
1/1606 . . {[with other specified detectors not provided for in the other sub-groups of G01T 1/16 (see provisionally also G01T 1/16)}
1/161 . . Applications in the field of nuclear medicine, e.g. in vivo counting (apparatus for radiation diagnosis A61B 6/00)
1/1611 . . {[using both transmission and emission sources sequentially (SPECT imaging G01T 1/1642; PET imaging G01T 1/2985; detecting hidden objects, e.g. weapons, explosives G01V 5/0008)}
1/1612 . . . . {[with scintillation detectors (G01T 1/20 takes precedence)}
1/1614 . . . . {[with semiconductor detectors (G01T 1/24 takes precedence)}
1/1615 . . . . {[using both transmission and emission sources simultaneously (SPECT imaging G01T 1/1642; PET imaging G01T 1/2985; detecting hidden objects, e.g. weapons, explosives G01V 5/0008)}
1/1617 . . . . {[with scintillation detectors (G01T 1/20 takes precedence)}
1/1618 . . . . {[with semiconductor detectors (G01T 1/24 takes precedence)}
1/163 . . Whole body counters (hand or feet contamination measurement G01T 1/167; lung, brain, thyroid, kidney or the like counting G01T 1/16)
1/1635 . . {[involving relative movement between detector and subject; scanning beds (profile scanning G01T 1/166; positioning patients, tiltable tables for radiation diagnosis A61B 6/04)}
1/164 . . . Scintigraphy (radioisotopes G21G 4/00; tracers G21H 5/00; {measurement of spatial distribution G01T 1/2914; apparatus for radiation diagnosis in different planes A61B 6/02})
1/1641 . . . . [Static instruments for imaging the distribution of radioactivity in one or two dimensions using one or several scintillating elements; Radio-isotope cameras]

1/1642 . . . . . . [using a scintillation crystal and position sensing photodetector arrays, e.g. ANGER cameras]

1/1644 . . . . . . [using an array of optically separate scintillation elements permitting direct location of scintillations (G01T 1/1645 takes precedence)]

1/1645 . . . . . . [using electron optical imaging means, e.g. image intensifier tubes, coordinate photomultiplier tubes, image converter]

1/1647 . . . . . . [Processing of scintigraphic data (not related to a particular imaging system G01T 1/2992)]

1/1648 . . . . . . . [Ancillary equipment for scintillation cameras, e.g. reference markers, devices for removing motion artifacts, calibration devices (adapted for flow studies G01T 1/1647)]

1/166 . . . . . . . [involved relative movement between detector and subject (scanners in general without using scintigraphy G01T 1/2964)]

1/1663 . . . . . . . [Processing methods of scan data, e.g. involving contrast enhancement, background reduction, smoothing, motion correction, dual radio-isotope scanning, computer processing (for measuring spatial distribution of radiation G01T 1/2992; general purpose image data processing G06T 1/00; computerized tomography G01T 1/30; G01T 1/361); Ancillary equipment (colour printers G01T 1/1666)]

1/1666 . . . . . . . . [adapted for printing different symbols or colours according to the intensity or energy level of the detected radioactivity (depth discrimination in colour G01T 1/2985)]

1/167 . . . . Measuring radioactive content of objects, e.g. contamination (whole body counters G01T 1/163)

1/169 . . . . Exploration, location of contaminated surface areas (prospecting by the use of nuclear radiation, e.g. of natural or induced radioactivity G01V 5/00); in situ measurement, e.g. floor contamination monitor (directional detectors G01T 1/2907)

1/17 . . . . Circuit arrangements not adapted to a particular type of detector (pulse-selection circuits H03K, G01R)

1/171 . . . . [Compensation of dead-time counting losses (see provisionally also G01T 1/17)]

1/172 . . . . with coincidence circuit arrangements (G01T 1/178 takes precedence; combination of detectors, see G01T 1/1603, G01T 1/30, G01T 1/361)]

1/175 . . . . Power supply circuits (power supply circuits per se H02J; converters H02M)

1/178 . . . . for measuring specific activity in the presence of other radioactive substances, e.g. natural, in the air or in liquids such as rain water

1/18 . . . . with counting-tube arrangements, e.g. with Geiger counters (tubes H01J 47/08; with alarm provision G01T 7/125)

1/185 . . . . with ionisation chamber arrangements (construction of ionisation chambers H01J 47/02; gas analysis by ionisation G01N 27/66; measuring pressure G01L 9/00; leak detection G01M 3/00; tele-measurements G08C)]

1/20 . . . . with scintillation detectors

1/2002 . . . . [Optical details, e.g. reflecting or diffusing layers]

1/2004 . . . . [Scintilloscopes (fluoroscopes G21K 4/00; radiation diagnosis A61B 6/00)]

1/2006 . . . . [using a combination of a scintillator and photodetector which measures the mean radiation intensity]

1/2008 . . . . [using a combination of different types of scintillation detectors, e.g. phoswich]

WARNING
Pending reclassification, for subject-matter regarding phoswich see also G01T 1/20

1/201 . . . . [using scintillating fibres]

1/2012 . . . . [using stimulable fibres, e.g. stimulable phosphor sheets]

1/2014 . . . . [Reading out of stimulable sheets, e.g. latent image]

1/2016 . . . . [Erasing of stimulable sheets, e.g. with light, heat or the like]

1/2018 . . . . [Scintillation-photodiode combination]

1/202 . . . . the detector being a crystal

1/2023 . . . . [Selection of materials (see provisionally also G01T 1/202)]

1/2026 . . . . [Well-type detectors (see provisionally also G01T 1/202)]

1/203 . . . . the detector being made of plastics

1/2033 . . . . [Selection of materials (see provisionally also G01T 1/203)]

1/2036 . . . . [Well-type detectors (see provisionally also G01T 1/203)]

1/204 . . . . the detector being a liquid

1/2042 . . . . [Composition for liquid scintillation systems]

1/2045 . . . . [Liquid scintillation quench systems]

1/2047 . . . . [Sample preparation]

1/205 . . . . the detector being a gas

1/208 . . . . Circuits specially adapted for scintillation detectors, e.g. for the photo-multiplier section

1/22 . . . . with Cerenkov detectors

1/24 . . . . with semiconductor detectors (semiconductor devices per se H01L 31/00)

1/241 . . . . [Electrode arrangements, e.g. continuous or parallel strips or the like (constructional or manufacturing details H01L 31/00)]

1/242 . . . . [Stacked detectors, e.g. for depth information (constructional or manufacturing details H01L 25/00)]

1/243 . . . . [Modular detectors, e.g. arrays formed from self contained units (constructional or manufacturing details H01L 25/00)]

1/244 . . . . [Auxiliary details, e.g. casings, cooling, damping or insulation against damage by, e.g. heat, pressure or the like]

1/245 . . . . [using memory cells]

1/246 . . . . [utilizing latent read-out, e.g. charge stored and read-out later]
1/27 . . . [Detector read-out circuitry (for processing gain or off-set correction H04N)]
1/28 . . . [Silicon photomultipliers [SiPM], e.g. an avalanche photodiode [APD] array on a common Si substrate]
1/29 . . . [specially adapted for use in SPECT or PET (SPECT imaging G01T 1/164; PET imaging G01T 1/2985; detecting hidden objects, e.g. weapons, explosives G01V 5/0008)]
1/26 . . . with resistance detectors (phototransistors H01L 31/00)
1/28 . . . with secondary-emission detectors (secondary-electron-emitting electrodes in general H01J 1/32; optionally combined with scintillation counters (secondary emission tubes H01J 43/00)]
1/29 . . . Measurement performed on radiation beams, e.g. position or section of the beam; Measurement of spatial distribution of radiation (scintigraphy G01T 1/164; mass-spectrometers H01J 49/025)
1/297 . . . [Angle determination; Directional detectors; Telescopes (prospecting by the use of nuclear radiation, e.g. of natural or induced radioactivity G01V 5/00)]
1/2014 . . . [Measurement of spatial distribution of radiation]
1/2921 . . . [Static instruments for imaging the distribution of radioactivity in one or two dimensions; Radio-isotope cameras (using scintigraphy G01T 1/164)]
1/2928 . . . [using solid state detectors]
1/2935 . . . [using ionisation detectors]
1/2932 . . . [using autoradiographic methods]
1/295 . . . [using coded aperture devices, e.g. Fresnel zone plates (handling of radiation of particles, e.g. using diaphragms, collimators, diffraction G21K 1/00)]
1/2957 . . . [using channel multiplier arrays (channel multipliers H01J 43/18; G01T 1/1645 takes precedence)]
1/2964 . . . [Scanners (using scintigraphy G01T 1/166)]
1/2971 . . . [using solid state detectors]
1/2978 . . . [Hybrid imaging systems, e.g. using a position sensitive detector (camera) to determine the distribution in one direction and using mechanical movement of the detector or the subject in the other direction or using a camera to determine the distribution in two dimensions and using movement of the camera or the subject to increase the field of view (G01T 1/2985 takes precedence)]
1/2985 . . . [In depth localisation, e.g. using positron emitters; Tomographic imaging (longitudinal and transverse section imaging; apparatus for radiation diagnosis sequentially in different planes, stereoscopic radiation diagnosis); (using external radiation sources A61B 60/02)]
1/2992 . . . [Radioisotope data or image processing not related to a particular imaging system; Offline processing of pictures, e.g. rescanners (for measuring radiation intensity G01T 1/1663; digital computing or data processing equipment or methods specially adapted for nuclear physics or nuclear engineering G06F 15/00; general purpose image data processing G06T 1/00; computerized tomography G06T 11/003)]
1/30 . . . [Measuring half-life of a radioactive substance (period meters for nuclear fission reactors G21C 17/14)]
1/32 . . . [Measuring polarisation of particles]
1/34 . . . [Measuring cross-section, e.g. absorption cross-section of particles]
1/36 . . . [Measuring spectral distribution of X-rays or of nuclear radiation (spectrometry (pulse selection circuits per se H03K; investigation of materials by radiation diffraction G01N 23/20; spectrometer tubes H01J 49/000)]
1/361 . . . [with a combination of detectors of different types, e.g. anti-Compton spectrometers (intensity measurement with a combination of detectors G01T 1/1603; with coincidence circuit G01T 1/172; see provisionally also G01T 1/36)]

NOTE
G01T 1/361 takes precedence over G01T 1/362

1/362 . . . [with scintillation detectors (see provisionally also G01T 1/36, G01T 1/20)]
1/363 . . . [with Cerenkov detectors]
1/365 . . . [with ionisation detectors, e.g. proportional counter (see provisionally also G01T 1/36)]
1/366 . . . [with semi-conductor detectors (see provisionally also G01T 1/36)]
1/367 . . . [with resistance detectors (see provisionally also G01T 1/36)]
1/368 . . . [with secondary-emission detectors (see provisionally G01T 1/36)]
1/38 . . . [Particle discrimination and measurement of relative mass, e.g. by measurement of loss of energy with distance (dE/dx) (constructional details of semiconductor detectors therefor H01L 31/00)]
1/40 . . . [Stabilisation of spectrometers ((circuits specially adapted for scintillation detectors G01T 1/208)]

3/00 Measuring neutron radiation (G01T 5/00) takes precedence; (tubes therefor H01J 47/12; circuits with such tubes G01T 1/18; measuring short time intervals G04F 10/00; measuring pulse characteristics G01R 29/02; neutron choppers G21K 1/04; polarimeters G01T 1/32)]
3/001 . . . [Spectrometry]
3/003 . . . [Recoil spectrometers (light-nuclei recoil ionisation tubes per se H01J 47/1277)]
3/005 . . . [Time-of-flight spectrometers (see provisionally also G01T 3/00)]
3/006 . . . [using self-powered detectors (for neutrons as well as for Y- or X-rays), e.g. using Compton-effect (Compton diodes) or photo-emission or a (n,B) nuclear reaction (photovoltaic semiconductors H01L 31/02; photo-tubes H01J 40/00; thermionic generators H01J 45/00; radioisotopic generators G21H 1/00, e.g. G21H 1/02, G21H 1/04)]
3/008 . . . [using an ionisation chamber filled with a gas, liquid or solid, e.g. frozen liquid, dielectric (G01T 3/006 takes precedence)]
3/02 . . . [by shielding other radiation]
3/04 . . . [using calorimetric devices]
3/06 . . . [with scintillation detectors]
3/065 . . . [Spectrometry]
with semiconductor detectors (semiconductor detectors per se H01L 31/00)

Recording of movements or tracks of particles (spark chambers H01J 47/00); Processing or analysis of such tracks

using a combination of several movement of track recording devices (detectors associated with recording chambers and only serving to trigger these chambers, see the appropriate groups of the chamber, e.g. G01T 5/04 - G01T 5/08; see provisionally also G01T 5/00 and other sub-groups)

Non-electrical readout of multi-wire or parallel-plate chambers (non-electrical readout in such chambers per se H01J 47/22)

by optical methods

by acoustical methods

Processing of tracks; Analysis of tracks

Cloud chambers, e.g. Wilson chamber

Bubble chambers

Scintillation chambers (discharge tubes H01J 40/00, H01J 47/00; semiconductor devices H01L)

Plates or blocks in which tracks of nuclear particles are made visible by after-treatment, e.g. using photographic emulsion, using mica

Circuit arrangements with multi-wire or parallel-plate chambers, e.g. spark chambers (tubes per se H01J 47/00)

for readout of each individual wires; (readout in such chambers per se H01J 47/16); for processing the output signals

by using delay lines

by using magnetostrictive delay lines

Details of radiation-measuring instruments

Collecting means for receiving or storing samples to be investigated [and possibly directly transporting the samples to the measuring arrangement; particularly for investigating radioactive fluids (sampling, preparing specimens for investigation in general G01N 1/00, G01N 1/02; shielded cells or rooms structurally combined with manipulatin devices G21F; measuring of chromatographically separated samples G01N 30/00 - G01N 30/96)]

by filtration

by electrostatic precipitation (G01T 7/04 takes precedence)

Means for conveying samples received { i.e. sample changers G01N 35/00}

using turntables

Provision for actuation of an alarm

Alarm- or controlling circuits using ionisation chambers, proportional counters or Geiger-Mueller tubes, also functioning as UV detectors (measuring radiation intensity with counting tubes G01T 1/18; measuring radiation intensity with ionisation chambers G01T 1/185; fire alarms actuated by presence of radiation of particles, e.g. of infra-red radiation, of ions G08B 17/11; flame monitoring in combustion devices F23Q 7/00, F23N; discharge tubes per se H01J 47/00)