

# CPC COOPERATIVE PATENT CLASSIFICATION

## G PHYSICS (NOTES omitted)

### INSTRUMENTS

**G02 OPTICS** (making optical elements or apparatus [B24B](#), [B29D 11/00](#), [C03](#), or other appropriate subclasses or classes; materials [per se](#), [see the relevant places](#), e.g. [C03B](#), [C03C](#))  
(NOTE omitted)

**G02F DEVICES OR ARRANGEMENTS, THE OPTICAL OPERATION OF WHICH IS MODIFIED BY CHANGING THE OPTICAL PROPERTIES OF THE MEDIUM OF THE DEVICES OR ARRANGEMENTS FOR THE CONTROL OF THE INTENSITY, COLOUR, PHASE, POLARISATION OR DIRECTION OF LIGHT**, e.g. SWITCHING, GATING, MODULATING OR DEMODULATING; TECHNIQUES OR PROCEDURES FOR THE OPERATION THEREOF; FREQUENCY-CHANGING; NON-LINEAR OPTICS; OPTICAL LOGIC ELEMENTS; OPTICAL ANALOGUE/DIGITAL CONVERTERS (optical transfer means between sensing member and indicating or recording part in connection with measuring [G01D 5/26](#); devices in which mathematical operations are carried out with optical elements [G06E 3/00](#), {[G06E 3/001](#)} ; electrical signal transmission systems using optical means to convert the input signal [G08C 19/36](#); information-recording by electric or magnetic means and reproducing by sensing optical properties [G11B 11/00](#); static stores using optical elements [G11C 13/04](#); transmission systems employing electromagnetic waves other than radio waves, e.g. light, infra-red radiation, [H04B 10/00](#); optical multiplex systems [H04J 14/00](#); pictorial communication, e.g. television [H04N](#))

#### **WARNINGS**

- The following IPC groups are not in the CPC scheme. The subject matter for these IPC groups is classified in the following CPC groups:  
Subject matter covered by these groups is classified in the following CPC groups:  
[G02F 1/13357](#) covered by [G02F 1/1336](#) and subgroups
- 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** **Devices or arrangements for the control of the intensity, colour, phase, polarisation or direction of light arriving from an independent light source, e.g. switching, gating, or modulating; Non-linear optics** (thermometers using change of colour or translucency [G01K 11/12](#); using changes in fluorescence [G01K 11/32](#); light guide devices [G02B 6/00](#); optical devices or arrangements using movable or deformable elements for controlling light independent of the light source [G02B 26/00](#); control of light in general [G05D 25/00](#); visible signalling systems [G08B 5/00](#); indicating arrangements for variable information by selection or combination of individual elements [G09F 9/00](#); control arrangements or circuits for visual indicators other than cathode-ray tubes [G09G 3/00](#); control of light sources [H01S 3/10](#), [H05B 33/08](#), [H05B 35/00](#) - [H05B 43/00](#); {photochromic filters [G02B 5/23](#); optical logic elements [G02F 3/00](#)})
- devices or arrangements, e.g. cells, the optical operation of which is modified by changing the optical properties of the medium of the devices or arrangements by the influence or control of physical parameters, e.g. electric fields, electric current, magnetic fields, sound or mechanical vibrations, stress or thermal effects;
  - devices or arrangements in which the electric or magnetic field component of the light beams influences the optical properties of the medium, i.e. non-linear optics;
  - control of light by electromagnetic waves, e.g. radio waves, or by electrons or other elementary particles.
- 1/0009 . {Materials therefor}
- NOTE**  
[G02F 1/0009](#) and subgroups contain mostly non-patent literature
- 1/0018 . . {Electro-optical materials}
- NOTE**  
This group covers only :

- 1/0027 . . . {with ferro-electric properties ([domain inversion in ferro-electric materials G02F 1/3558](#); [ferro-electric materials in general H01G 7/02](#))}
- 1/0036 . . {Magneto-optical materials ([magnetic materials in general H01F](#))}
- 1/0045 . . {Liquid crystals as far as the physical properties are concerned ([chemical composition and properties of liquid crystals C09K 19/00](#))}
- 1/0054 . . {Structure, phase transitions, NMR, ESR, Moessbauer spectra}
- 1/0063 . . {Optical properties, e.g. absorption, reflection, non-linear effects, birefringence ([non linear optics in general G02F 1/35](#))}
- 1/0072 . . {Mechanical, acoustic, electro-elastic, magneto-elastic properties}
- 1/0081 . . {Electric or magnetic properties}
- 1/009 . . {Thermal properties ([thermometers using change of colour or translucency G01K 11/12](#); [radiation pyrometry G01J 5/00](#))}
- 1/01 . . for the control of the intensity, phase, polarisation or colour ([G02F 1/29](#), [G02F 1/35](#) take precedence)
- WARNING**
- Group [G02F 1/01](#) is impacted by reclassification into groups [G02F 1/165](#), [G02F 1/166](#), [G02F 1/1673](#), and [G02F 1/169](#).
- All groups listed in this Warning should be considered in order to perform a complete search.
- 1/0102 . . {Constructional details ([G02F 1/1306](#), [G02F 1/133](#) take precedence)}
- 1/0105 . . . {Illumination devices ([for liquid crystal cells G02F1/13357](#); [for display devices for electronic time pieces G04G 9/0041](#))}
- 1/0107 . . . {Gaskets, spacers, sealing of the cell; Filling and closing of the cell ([for liquid crystal cells G02F 1/1339](#), [G02F 1/1341](#); [for electrochromic or electrolytic cells G02F 1/161](#))}
- 1/011 . . {in optical waveguides ([G02F 1/0134](#), [G02F 1/01708](#), [G02F 1/025](#), [G02F 1/035](#), [G02F 1/0508](#), [G02F 1/0553](#), [G02F 1/065](#), [G02F 1/073](#), [G02F 1/095](#), [G02F 1/125](#), [G02F 1/1326](#), [G02F 1/225](#) take precedence; [optical waveguides in general G02B 6/00](#))}
- 2001/0113 . . . {made of glass, e.g. silica-based optical waveguides}
- 1/0115 . . . {in optical fibres}
- 1/0118 . . . . {by controlling the evanescent coupling of light from a fibre into an active, e.g. electro-optic, overlay}
- 1/0121 . . {Operation of the device; Circuit arrangements not otherwise provided for ([G02F 1/0327](#), [G02F 1/0516](#), [G02F 1/076](#), [G02F 1/092](#), [G02F 1/113](#), [G02F 1/13306](#), [G02F 1/163](#) take precedence)}
- 1/0123 . . . {Circuits for the control or stabilisation of the bias voltage, e.g. automatic bias control [ABC] feedback loops}
- 1/0126 . . {by another light beam, i.e. opto-optical modulation ([G02F 1/01716](#), [G02F 1/0338](#), [G02F 1/0533](#), [G02F 1/0541](#), [G02F 1/0558](#), [G02F 1/135](#), [G02F 1/293](#) take precedence)}
- 1/0128 . . {based on electro-mechanical, magneto-mechanical, elasto-optic effects}
- 1/0131 . . . {based on elasto-optic, i.e. photoelastic effect, e.g. mechanically induced birefringence ([acousto-optic devices G02F 1/11](#))}
- 1/0134 . . . . {in optical waveguides}
- 1/0136 . . {for the control of polarisation, e.g. state of polarisation [SOP] control, polarisation scrambling, TE-TM mode conversion or separation ([G02F 1/0353](#) takes precedence)}
- 2001/0139 . . . {Polarisation scrambling; Depolarisers}
- 2001/0142 . . . {TE-TM mode conversion}
- 2001/0144 . . . {TE-TM mode separation}
- 1/0147 . . {based on thermo-optic effects ([G02F 1/132](#) takes precedence; [tenebrescent compositions C09K 9/00](#); [radiation pyrometry G01J 5/00](#); [thermometers using change of colour or translucency G01K 11/12](#))}
- 1/015 . . based on semiconductor elements with at least one potential jump barrier, e.g. PN, PIN junction ([G02F 1/03](#) takes precedence)
- 2001/0151 . . . . {modulating the refractive index}
- 2001/0152 . . . . . {by free carrier effects (Plasma)}
- 2001/0153 . . . . . {by electro-refraction (Kramers-Kronig relation)}
- 2001/0154 . . . . . {by electro-optic effects (LEO=Pockels, QEO=Kerr)}
- 2001/0155 . . . . {modulating the optical absorption}
- 2001/0156 . . . . . {by free carrier absorption}
- 2001/0157 . . . . . {by electro-absorption effects (FK, Stark, QCSE)}
- 2001/0158 . . . . . {with blue-shift of the absorption band}
- 2001/0159 . . . . . {with red-shift of the absorption band}
- 1/017 . . . Structures with periodic or quasi periodic potential variation, e.g. superlattices, quantum wells
- 1/01708 . . . . . {in an optical waveguide structure}
- 1/01716 . . . . . {Optically controlled superlattice or quantum well devices}
- 1/01725 . . . . . {with a non-rectangular quantum well structure, e.g. coupled, graded, stepped quantum wells}
- 2001/01733 . . . . . {Coupled or double quantum wells}
- 2001/01741 . . . . . {Asymmetrically coupled or double quantum wells}
- 2001/0175 . . . . . {with a spatially varied well profile, e.g. graded, stepped quantum wells}
- 2001/01758 . . . . . {with an asymmetric well profile, e.g. asymmetrically stepped quantum wells}
- 2001/01766 . . . . . {Strained superlattice or quantum well devices}
- 2001/01775 . . . . . {involving an intersubband transition in one well, e.g. e1->e2}
- 2001/01783 . . . . . {Quantum wire}
- 2001/01791 . . . . . {Quantum box or dot}
- 1/025 . . . . in an optical waveguide structure ([G02F 1/017](#), [G02F 1/2257](#) take precedence)
- 1/03 . . based on ceramics or electro-optical crystals, e.g. exhibiting Pockels effect or Kerr effect ([G02F 1/061](#) takes precedence)
- 1/0305 . . . . {Constructional arrangements ([G02F 1/0327](#) - [G02F 1/05](#) take precedence)}

- 1/0311 . . . . {Structural association of optical elements, e.g. lenses, polarizers, phase plates, with the crystal}
- 1/0316 . . . . {Electrodes}
- 1/0322 . . . . {Arrangements comprising two or more independently controlled crystals}
- 1/0327 . . . {Operation of the cell; Circuit arrangements ([G02F 1/05](#) takes precedence)}
- 1/0333 . . . {addressed by a beam of charged particles, e.g. directed to an adjacent layer exhibiting secondary emission or bombardment-induced conductivity effect ([G02F 1/05](#) takes precedence; [electrography, electrophotography G03G](#); screens for cathode ray tubes acting as light valves [H01J 29/12](#))}
- 1/0338 . . . {structurally associated with a photoconductive layer or having photo-refractive properties ([G02F 1/05](#) takes precedence)}
- 1/0344 . . . {controlled by a high-frequency electromagnetic wave component in an electric waveguide ([G02F 1/0356](#), [G02F 1/05](#), [G02F 1/2255](#), [G02F 1/3134](#) take precedence)}
- 1/035 . . . in an optical waveguide structure
- 1/0353 . . . . {involving an electro-optic TE-TM mode conversion}
- 1/0356 . . . . {controlled by a high-frequency electromagnetic wave component in an electric waveguide structure}
- 1/05 . . . with ferro-electric properties ([G02F 1/035](#), [G02F 1/055](#) take precedence {; domain inversion in ferro-electric materials [G02F 1/3558](#); ferro-electric digital stores [G11C 11/22](#))}
- 1/0508 . . . . {specially adapted for gating or modulating in optical waveguides}
- 1/0516 . . . . {Operation of the cell; Circuit arrangements}
- 1/0525 . . . . {addressed by a beam of charged particles, e.g. directed to an adjacent layer exhibiting secondary emission or bombardment-induced conductivity effect ([electrography, electrophotography G03G](#); screens for cathode-ray tubes acting as light valves [H01J 29/12](#))}
- 1/0533 . . . . {structurally associated with a photoconductive layer}
- 1/0541 . . . . {using photo-refractive effects ([holography G03H](#); electro-optical digital static stores using an interference pattern [G11C 13/044](#))}
- 1/055 . . . the active material being a ceramic ([G02F 1/035](#) takes precedence)
- 1/0551 . . . . {Constructional details}
- 1/0553 . . . . {specially adapted for gating or modulating in optical waveguides}
- 1/0555 . . . . {Operation of the cell; Circuit arrangements}
- 1/0556 . . . . {specially adapted for a particular application}
- 1/0558 . . . . {structurally associated with a photoconductive layer or exhibiting photo-refractive properties}
- 1/061 . . based on electro-optical organic material ([G02F 1/07](#), {[G02F 1/13](#) take precedence})
- 1/065 . . . in an optical waveguide structure
- 1/07 . . based on electro-optical liquids exhibiting Kerr effect
- 1/073 . . . {specially adapted for gating or modulating in optical waveguides}
- 1/076 . . . {Operation of the cell; Circuit arrangements}
- 1/09 . . based on magneto-optical elements, e.g. exhibiting Faraday effect
- 1/091 . . . {based on magneto-absorption or magneto-reflection}
- 1/092 . . . {Operation of the cell; Circuit arrangements}
- 1/093 . . . {used as non-reciprocal devices, e.g. optical isolators, circulators ([G02F 1/0955](#) takes precedence)}
- 2001/094 . . . {Based on magnetophoretic effect}
- 1/095 . . . in an optical waveguide structure
- 1/0955 . . . . {used as non-reciprocal devices, e.g. optical isolators, circulators}
- 1/11 . . based on acousto-optical elements, e.g. using variable diffraction by sound or like mechanical waves ({[elasto-optic effect without wave propagation G02F 1/0131](#); } [acousto-optical deflection G02F 1/33](#))}
- 1/113 . . . {Circuit or control arrangements}
- 1/116 . . . {using an optically anisotropic medium, wherein the incident and the diffracted light waves have different polarizations, e.g. acousto-optic tunable filter [AOTF] ([G02F 1/125](#) takes precedence)}
- 1/125 . . . in an optical waveguide structure
- 1/13 . . based on liquid crystals, e.g. single liquid crystal display cells ([liquid crystal materials C09K 19/00](#))
- 1/1303 . . . {Apparatus specially adapted to the manufacture of LCDs}
- 1/1306 . . . {Details ([not used, see sub-groups](#))}
- 1/1309 . . . . {Repairing; Testing ([testing of optical apparatus G01M 11/00](#); [electronic testing of displays or display drivers, e.g. of LCDs, G09G 3/006](#))}
- 1/1313 . . . {specially adapted for a particular application}
- 2001/1316 . . . {Cleaning methods or materials for cleaning part of liquid crystal cell components during the manufacturing process}
- 1/132 . . . {Thermal activation of liquid crystals exhibiting a thermo-optic effect ([thermometers using change of colour or translucency of liquid crystals G01K 11/165](#); [thermally addressed liquid crystal elements in a matrix G09G 3/3603](#))}
- 1/1323 . . . {Arrangements for providing a switchable viewing angle}
- 1/1326 . . . {Liquid crystal optical waveguides or liquid crystal cells specially adapted for gating or modulating between optical waveguides}
- 1/133 . . . Constructional arrangements; Operation of liquid crystal cells; Circuit arrangements ([arrangements or circuits for control of liquid crystal elements in a {segment display or a} matrix, not structurally associated with these elements, {respectively \[G09G 3/18\]\(#\) and } \[G09G 3/36\]\(#\)](#))}
- 1/13306 . . . . {Circuit arrangements or driving methods for the control of single liquid crystal cells ([G02F 1/132](#), [G02F 1/133382](#) take precedence)}
- 2001/13312 . . . . {Circuits comprising a photodetector not for feedback}

## G02F

- 1/13318 . . . . . {Circuits comprising a photodetector}
- 2001/13324 . . . . . {Circuits comprising a solar cell}
- 1/1333 . . . . . Constructional arrangements;  
{Manufacturing methods} ([G02F 1/135](#),  
[G02F 1/136](#) take precedence)
- 2001/133302 . . . . . {rigid substrate, e.g. inorganic}
- 1/133305 . . . . . {Flexible substrates, e.g. plastics, organic  
film}
- 1/133308 . . . . . {LCD panel immediate support structure,  
e.g. front and back frame or bezel}
- 2001/133311 . . . . . {Environmental protection, e.g. dust,  
humidity}
- 2001/133314 . . . . . {Back frame}
- 2001/133317 . . . . . {Intermediate frame, e.g. between  
backlight housing and front frame}
- 2001/13332 . . . . . {Front frame}
- 2001/133322 . . . . . {Mechanical guiding and alignment of  
LCD panel support components}
- 2001/133325 . . . . . {Method of assembling ([G02F 2201/465](#)  
takes precedence)}
- 2001/133328 . . . . . {Segmented frame}
- 2001/133331 . . . . . {Cover glass}
- 2001/133334 . . . . . {Electromagnetic shield}
- 2001/133337 . . . . . {Ion-diffusion preventing or absorbing  
layer}
- 1/13334 . . . . . {Plasma addressed liquid crystal cells  
[PALC] ([plasma panels H01J 17/49](#))}
- 2001/133342 . . . . . {for double side displays}
- 1/133345 . . . . . {Insulating layers ([G02F 1/1335](#),  
[G02F 1/1337](#), [G02F 1/135](#), [G02F 1/136](#)  
take precedence)}
- 1/133348 . . . . . {Charged-particles, e.g. electron-beam,  
addressed liquid crystals cells ([screen  
for cathode ray tubes acting as light  
valves H01J 29/12](#); [electrography](#),  
[electrophotography G03G](#))}
- 1/133351 . . . . . {Manufacturing of individual cells out of a  
plurality of cells, e.g. by dicing}
- 2001/133354 . . . . . {Arrangements for aligning or assembling  
the substrates}
- 2001/133357 . . . . . {Planarisation layer}
- 1/13336 . . . . . {Combining plural substrates to produce  
large-area displays, e.g. tiled displays}
- 1/133362 . . . . . {Optically addressed liquid crystal cells  
([G02F 1/135](#) takes precedence)}
- 1/133365 . . . . . {Cells in which the active layer  
comprises a liquid crystalline polymer  
([liquid crystalline polymers in general  
C09K 19/38](#))}
- 2001/133368 . . . . . {cell having two substrates with different  
characteristic, e.g. thickness or material}
- 1/133371 . . . . . {Cells with varying thickness of the liquid  
crystal layer}
- 2001/133374 . . . . . {for displaying permanent signs or marks}
- 1/133377 . . . . . {Cells with plural compartments or having  
plurality of liquid crystal microcells  
partitioned by walls, e.g. one microcell per  
pixel}
- 1/13338 . . . . . {Input devices, e.g. touch-panels  
([specially adapted as input devices to  
computers G06F 3/033](#); [touch-panels per  
se G06K 11/06](#), [keyboard switches per se  
H01H 13/70](#))}
- 1/133382 . . . . . {Heating or cooling of liquid crystal cells  
other than for activation, e.g. circuits or  
arrangements for temperature control,  
stabilisation or uniform distribution over  
the cell}
- 1/133385 . . . . . {with cooling means, e.g. fans}
- 2001/133388 . . . . . {Constructional difference between the  
display region and the peripheral region}
- 2001/133391 . . . . . {Constructional arrangement for sub-  
divided displays}
- 2001/133394 . . . . . {Piezoelectric element associated with the  
cell}
- 2001/133397 . . . . . {for suppressing after-image or image-  
sticking}
- 1/1334 . . . . . based on polymer dispersed liquid crystals,  
e.g. microencapsulated liquid crystals  
([compositions C09K 19/544](#))}
- 1/13342 . . . . . {Holographic polymer dispersed liquid  
crystals}
- 2001/13345 . . . . . {Network or three-dimensional gel}
- 2001/13347 . . . . . {Reverse mode, i.e. clear in the off-state  
and scattering in the on-state}
- 1/1335 . . . . . Structural association of cells with optical  
devices, e.g. polarisers or reflectors
- 1/133502 . . . . . {Antiglare, refractive index matching  
layers}
- 1/133504 . . . . . {Diffusing, scattering, diffracting  
elements ([associated to illuminating  
devices G02F 1/133606](#))}
- 2001/133507 . . . . . {Luminance enhancement films}
- 1/133509 . . . . . {Filters, e.g. light shielding masks  
([optical filters G02B 5/20](#))}
- 1/133512 . . . . . {Light shielding layers, e.g. black  
matrix ([G02F 1/136209](#) takes  
precedence)}
- 1/133514 . . . . . {Colour filters ([luminescent elements  
G02F 1/133617](#))}
- 1/133516 . . . . . {Methods of making thereof,  
e.g. printing, electro-deposition,  
photolithography ([photomechanical  
production of textured or patterned  
surfaces G03F](#))}
- 2001/133519 . . . . . {overcoating}
- 2001/133521 . . . . . {Interference filters}
- 1/133524 . . . . . {Light-guides, e.g. fibre-optic bundles,  
louvered or jalousie light-guides}
- 1/133526 . . . . . {Lenses, e.g. microlenses, Fresnel lenses  
([lenses in general G02B 3/00](#))}
- 1/133528 . . . . . {Polarisers ([polarisers per se  
G02B 5/30](#))}
- 2001/133531 . . . . . {Special arrangement of polariser or  
analyser axes}
- 1/133533 . . . . . {Colour selective polarisers  
([G02F 1/1347](#) takes precedence)}
- 1/133536 . . . . . {Reflective polarizers ([G02F 1/13362](#)  
takes precedence)}
- 2001/133538 . . . . . {with a spatial distribution of the  
polarisation direction}
- 2001/133541 . . . . . {Circular polarisers}
- 2001/133543 . . . . . {Cholesteric polarisers}
- 2001/133545 . . . . . {Dielectric stack polarisers}
- 2001/133548 . . . . . {Wire-grid polarisers}
- 2001/13355 . . . . . {Polarising beam splitters [PBS]}



1/133553 . . . . .	{Reflecting elements (associated to illuminating devices <a href="#">G02F 1/133605</a> )}	2001/133631 . . . . .	{with a spatial distribution of the retardation value}
1/133555 . . . . .	{Transflectors}	1/133632 . . . . .	{with refractive index ellipsoid inclined relative to the LC-layer surface}
2001/133557 . . . . .	{Half-mirror}	2001/133633 . . . . .	{using mesogenic materials}
2001/13356 . . . . .	{Particular location of the optical element}	1/133634 . . . . .	{the refractive index Nz perpendicular to the element surface being different from in-plane refractive indices Nx and Ny, e.g. biaxial or with normal optical axis}
2001/133562 . . . . .	{on the viewer side}	2001/133635 . . . . .	{Multifunctional compensators}
2001/133565 . . . . .	{inside the LC element, i.e. between the cell substrates}	1/133636 . . . . .	{with twisted orientation, e.g. comprising helically oriented LC-molecules or a plurality of twisted birefringent sublayers}
2001/133567 . . . . .	{on the back side}	2001/133637 . . . . .	{characterized by the wavelength dispersion}
1/1336 . . . . .	{Illuminating devices (in general <a href="#">F21V</a> ; associated with display devices for electronic watches <a href="#">G04G 9/0041</a> )}	2001/133638 . . . . .	{Waveplates, i.e. plates with a retardation value of $\lambda/2n$ }
2001/133601 . . . . .	{for spatial active dimming}	1/1337 . . . . .	Surface-induced orientation of the liquid crystal molecules, e.g. by alignment layers
1/133602 . . . . .	{Direct backlight}	1/133703 . . . . .	{by introducing organic surfactant additives into the liquid crystal material ( <a href="#">C09K 19/56</a> takes precedence)}
1/133603 . . . . .	{with LEDs}	1/133707 . . . . .	{Structures for producing distorted electric fields, e.g. bumps, protrusions, recesses, slits in pixel electrodes}
1/133604 . . . . .	{with lamps}	1/133711 . . . . .	{by organic films, e.g. polymeric films}
1/133605 . . . . .	{including specially adapted reflectors}	2001/133715 . . . . .	{by first depositing a monomer}
1/133606 . . . . .	{including a specially adapted diffusing, scattering or light controlling members}	1/133719 . . . . .	{with coupling agent molecules, e.g. silane}
2001/133607 . . . . .	{the light controlling member including light directing or refracting elements, e.g. prisms or lenses}	1/133723 . . . . .	{Polyimide, polyamide-imide}
1/133608 . . . . .	{including particular frames or supporting means}	2001/133726 . . . . .	{made of a mesogenic material}
1/133609 . . . . .	{including means for improving the color mixing, e.g. white}	2001/13373 . . . . .	{Disclination line; Reverse tilt}
1/133611 . . . . .	{including means for improving the brightness uniformity}	1/133734 . . . . .	{by obliquely evaporated films, e.g. Si or SiO <sub>2</sub> films}
2001/133612 . . . . .	{Electrical details}	2001/133738 . . . . .	{for homogeneous alignment}
2001/133613 . . . . .	{including a particular sequence of light sources}	2001/133742 . . . . .	{for homeotropic alignment}
2001/133614 . . . . .	{the light is generated by photoluminescence, e.g. a phosphor is illuminated by UV or blue light}	2001/133746 . . . . .	{for high pretilt angle, i.e. > 15 degrees}
1/133615 . . . . .	{Edge-illuminating devices, i.e. illuminating from the side ( <a href="#">G02B 6/0001</a> takes precedence)}	2001/133749 . . . . .	{for low pretilt angle, i.e. < 15 degrees}
2001/133616 . . . . .	{Front illuminating devices}	1/133753 . . . . .	{with different alignment orientations or pretilt angles on a same surface, e.g. for grey scale or improved viewing angle}
1/133617 . . . . .	{Illumination with ultra-violet light; Luminescent elements or materials associated to the cell}	2001/133757 . . . . .	{with different alignment orientations}
2001/133618 . . . . .	{for ambient light}	2001/133761 . . . . .	{with different pretilt angles}
1/13362 . . . . .	{providing polarised light, e.g. by converting a polarisation component into another one (optical systems for polarising <a href="#">G02B 27/28</a> )}	2001/133765 . . . . .	{without a surface treatment}
1/133621 . . . . .	{providing coloured light ( <a href="#">G02F 1/133617</a> , <a href="#">G02F 1/133533</a> take precedence)}	2001/133769 . . . . .	{comprising an active, e.g. switchable alignment layer}
2001/133622 . . . . .	{colour sequential illumination}	2001/133773 . . . . .	{The alignment material or treatment is different for the two opposite substrates}
2001/133623 . . . . .	{Inclined coloured light beams}	2001/133776 . . . . .	{having structures, i.e. unevenness locally influencing the alignment}
2001/133624 . . . . .	{having a particular spectral emission}	1/13378 . . . . .	{by treatment of the surface, e.g. embossing, rubbing, light irradiation ( <a href="#">G02F 1/133711</a> , <a href="#">G02F 1/133734</a> , <a href="#">G02F 1/133753</a> take precedence)}
2001/133625 . . . . .	{Electron stream lamps}	1/133784 . . . . .	{by rubbing}
2001/133626 . . . . .	{providing two modes of illumination, e.g. day-night}	1/133788 . . . . .	{by light irradiation, e.g. linearly polarised light photo-polymerisation}
2001/133627 . . . . .	{Projection-direct viewing}	2001/133792 . . . . .	{by etching}
2001/133628 . . . . .	{with cooling means}	2001/133796 . . . . .	{having conducting property}
1/13363 . . . . .	Birefringent elements, e.g. for optical compensation		

## G02F

1/1339 . . . . .	Gaskets; Spacers; Sealing of cells	1/13475 . . . . .	{in which at least one liquid crystal cell or layer is doped with a pleochroic dye, e.g. GH-LC cell ( <a href="#">G02F 1/13476 takes precedence</a> )}
1/13392 . . . . .	{spacers dispersed on the cell substrate, e.g. spherical particles, microfibrils}	1/13476 . . . . .	{in which at least one liquid crystal cell or layer assumes a scattering state}
1/13394 . . . . .	{spacers regularly patterned on the cell substrate, e.g. walls, pillars ( <a href="#">G02F 1/133377 takes precedence</a> )}	2001/13478 . . . . .	{based on selective reflection}
2001/13396 . . . . .	{Spacers having different sizes}	1/135 . . . . .	Liquid crystal cells structurally associated with a photoconducting or a ferro-electric layer, the properties of which can be optically or electrically varied ( <a href="#">G02F 1/133348 takes precedence</a> )}
2001/13398 . . . . .	{Materials and properties of the spacer}	2001/1351 . . . . .	{light-absorbing or blocking layer}
1/1341 . . . . .	Filling or closing of cells	2001/1352 . . . . .	{light-reflecting layer}
2001/13415 . . . . .	{Drop filling process}	1/1354 . . . . .	{having a particular photoconducting structure or material}
1/1343 . . . . .	Electrodes {(reflective electrodes <a href="#">G02F 1/133553</a> )}	2001/1355 . . . . .	{material or manufacturing process thereof}
1/134309 . . . . .	{characterised by their geometrical arrangement ( <a href="#">G09F 9/302 takes precedence</a> )}	2001/1357 . . . . .	{electrode structure}
2001/134318 . . . . .	{having a patterned common electrode}	1/1358 . . . . .	{the supplementary layer being a ferro-electric layer}
1/134327 . . . . .	{Segmented, e.g. alpha numeric display}	1/136 . . . . .	Liquid crystal cells structurally associated with a semi-conducting layer or substrate, e.g. cells forming part of an integrated circuit ( <a href="#">G02F 1/135 takes precedence</a> )}
1/134336 . . . . .	{Matrix}	2001/13606 . . . . .	{having means for reducing parasitic capacitance}
2001/134345 . . . . .	{Subdivided pixels, e.g. grey scale, redundancy}	2001/13613 . . . . .	{the semiconductor element is formed on a first substrate and thereafter transferred to the final cell substrate}
2001/134354 . . . . .	{the sub-pixels being capacitively coupled}	1/1362 . . . . .	Active matrix addressed cells ( <a href="#">G02F 1/134336, G02F 1/134363 take precedence</a> )}
1/134363 . . . . .	{for applying an electric field parallel to the substrate, i.e. in-plane switching [IPS]}	1/136204 . . . . .	{Arrangements to prevent high voltage or static electricity failures}
2001/134372 . . . . .	{for fringe field switching [FFS] where the common electrode is not patterned, e.g. planar}	1/136209 . . . . .	{Light shielding layers, e.g. black matrix, incorporated in the active matrix substrate, e.g. structurally associated with the switching element}
2001/134381 . . . . .	{Hybrid switching mode, i.e. for applying an electric field both parallel and orthogonal to the substrates}	1/136213 . . . . .	{Storage capacitors associated with the pixel electrode}
1/13439 . . . . .	{characterised by their electrical, optical, physical properties; materials therefor; method of making}	2001/136218 . . . . .	{Shield electrode}
1/1345 . . . . .	Conductors connecting electrodes to cell terminals	2001/136222 . . . . .	{Color filter incorporated in the active matrix substrate}
1/13452 . . . . .	{Conductors connecting driver circuitry and terminals of panels ( <a href="#">H01L 21/00 takes precedence</a> ; electrical details inside the cell <a href="#">G02F 1/133</a> ;)}	1/136227 . . . . .	{Through-hole connection of the pixel electrode to the active element through an insulation layer}
1/13454 . . . . .	{Drivers integrated on the active matrix substrate ( <a href="#">G02F 1/136277 takes precedence</a> )}	2001/136231 . . . . .	{for reducing the number of lithographic steps}
2001/13456 . . . . .	{cell terminals on one side of the display only}	2001/136236 . . . . .	{using a gray or half tone lithographic process}
1/13458 . . . . .	{Terminal pads}	1/13624 . . . . .	{having more than one switching element per pixel}
1/1347 . . . . .	Arrangement of liquid crystal layers or cells in which the final condition of one light beam is achieved by the addition of the effects of two or more layers or cells {(colour projection displays with liquid crystal valves <a href="#">H04N 9/3197</a> )}	2001/136245 . . . . .	{having complementary transistors}
1/13471 . . . . .	{in which all the liquid crystal cells or layers remain transparent, e.g. FLC, ECB, DAP, HAN, TN, STN, SBE-LC cells ( <a href="#">G02F 1/13475 takes precedence</a> )}	2001/13625 . . . . .	{Patterning using a multi-mask exposure}
1/13473 . . . . .	{for wavelength filtering or for colour display without the use of colour mosaic filters}	2001/136254 . . . . .	{Checking; Testing}
		1/136259 . . . . .	{Repairing; Defects}
		2001/136263 . . . . .	{Line defect}
		2001/136268 . . . . .	{Switch defect}
		2001/136272 . . . . .	{Auxiliary line}
		1/136277 . . . . .	{formed on a semiconductor substrate, e.g. silicon}

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- 2001/136281 . . . . . {having a transmissive semiconductor substrate}
- 1/136286 . . . . . {Wiring, e.g. gate line, drain line}
- 2001/13629 . . . . . {Multi-layer wirings}
- 2001/136295 . . . . . {Materials; Compositions; Methods of manufacturing}
- 1/1365 . . . . . in which the switching element is a two-electrode device {(G02F 1/136277 takes precedence)}
- 1/1368 . . . . . in which the switching element is a three-electrode device {(G02F 1/136277 takes precedence)}
- 2001/13685 . . . . . {Top gate}
- 1/137 . . . characterised by the electro-optical or magneto-optical effect, e.g. field-induced phase transition, orientation effect, guest-host interaction or dynamic scattering
- 2001/13706 . . . . . {the LC having positive dielectric anisotropy}
- 2001/13712 . . . . . {the LC having negative dielectric anisotropy}
- 1/13718 . . . . . {based on a change of the texture state of a cholesteric liquid crystal}
- 1/13725 . . . . . {based on guest-host interaction (G02F 1/13762, G02F 1/13737, take precedence)}
- 1/13731 . . . . . {based on a field-induced phase transition (G02F 1/13781 takes precedence)}
- 1/13737 . . . . . {in liquid crystals doped with a plechroic dye}
- 1/13743 . . . . . {based on electrohydrodynamic instabilities or domain formation in liquid crystals}
- 1/1375 . . . . . {using dynamic scattering}
- 2001/13756 . . . . . {the liquid crystal selectively assuming a light-scattering state (G02F 1/1334, G02F 1/13718 take precedence)}
- 1/13762 . . . . . {containing luminescent or electroluminescent additives (luminescent materials in general C09K 11/00; compositions of liquid crystals comprising additives C09K 19/52 - C09K 19/603; electroluminescent light sources H05B 33/00)}
- 1/13768 . . . . . {based on magneto-optical effects}
- 2001/13775 . . . . . {Polymer stabilized liquid crystal layers}
- 1/13781 . . . . . {using smectic liquid crystals (G02F 1/141 takes precedence)}
- 2001/13787 . . . . . {Hybrid alignment cells (G02F 1/1393 takes precedence)}
- 2001/13793 . . . . . {Blue phases}
- 1/139 . . . . . based on orientation effects in which the liquid crystal remains transparent
- 1/1391 . . . . . {Bistable or multi-stable liquid crystal cells (G02F 1/141 takes precedence)}
- 1/1392 . . . . . {using a field-induced sign-reversal of the dielectric anisotropy}
- 1/1393 . . . . . {the birefringence of the liquid crystal being electrically controlled, e.g. ECB-, DAP-, HAN-, PI-LC cells (G02F 1/1396, G02F 1/141 take precedence)}
- 1/1395 . . . . . {Optically compensated birefringence [OCB]- cells or PI- cells}
- 1/1396 . . . . . {the liquid crystal being selectively controlled between a twisted state and a non-twisted state, e.g. TN-LC cell (G02F 1/141 takes precedence)}
- 1/1397 . . . . . {the twist being substantially higher than 90°, e.g. STN-, SBE-, OMI-LC cells}
- 2001/1398 . . . . . {the twist being below 90°C}
- 1/141 . . . . . using ferroelectric liquid crystals
- 2001/1412 . . . . . {Antiferroelectric liquid crystals}
- 2001/1414 . . . . . {Deformed helix ferroelectric [DHL]}
- 1/1416 . . . . . {Details of the smectic layer structure, e.g. bookshelf, chevron, C1 and C2}
- 1/1418 . . . . . {using smectic liquid crystals, e.g. based on the electroclinic effect}
- 1/15 . . . based on an electrochromic effect
- WARNING**
- Group G02F 1/15 is impacted by reclassification into groups G02F 1/1514 and G02F 1/1516.
- All groups listed in this Warning should be considered in order to perform a complete search.
- 2001/1502 . . . . . {complementary cell}
- 2001/15025 . . . . . {having an inorganic electrochromic layer and a second solid organic electrochromic layer}
- 1/1503 . . . . . caused by oxidation-reduction reactions in organic liquid solutions, e.g. viologen solutions
- 1/1506 . . . . . caused by electrodeposition, e.g. electrolytic deposition of an inorganic material on or close to an electrode
- 1/1508 . . . . . {using a solid electrolyte}
- 1/1514 . . . . . characterised by the electrochromic material, e.g. by the electrodeposited material
- WARNING**
- Group G02F 1/1514 is incomplete pending reclassification of documents from group G02F 1/15.
- Groups G02F 1/15 and G02F 1/1514 should be considered in order to perform a complete search.
- 2001/15145 . . . . . {the electrochromic layer comprises a mixture of anodic and cathodic compounds}
- 1/1516 . . . . . comprising organic material
- WARNING**
- Group G02F 1/1516 is incomplete pending reclassification of documents from group G02F 1/15.
- Groups G02F 1/15 and G02F 1/1516 should be considered in order to perform a complete search.
- 1/15165 . . . . . {Polymers}
- 2001/1517 . . . . . {Ciano complex compounds, e.g. Prussian blue}
- 2001/1518 . . . . . {Ferrocene compounds}

- 1/1523 . . . . comprising inorganic material
- WARNING**
- Group [G02F 1/1523](#) is impacted by reclassification into group [G02F 1/1524](#). Groups [G02F 1/1523](#) and [G02F 1/1524](#) should be considered in order to perform a complete search.
- 1/1524 . . . . . Transition metal compounds
- WARNING**
- Group [G02F 1/1524](#) is incomplete pending reclassification of documents from group [G02F 1/1523](#). Groups [G02F 1/1523](#) and [G02F 1/1524](#) should be considered in order to perform a complete search.
- 1/15245 . . . . . {based on iridium oxide or hydroxide}
- 1/1525 . . . . . {characterised by a particular ion transporting layer, e.g. electrolyte}
- 1/153 . . . . Constructional details
- 1/1533 . . . . {structural features not otherwise provided for}
- 2001/1536 . . . . . {additional, e.g. protective, layer inside the cell}
- 1/155 . . . . . Electrodes
- 2001/1552 . . . . . {Inner electrode, e.g. the electrochromic layer being sandwiched between the inner electrode and the support substrate--- this group, now to be changed, should already been created by implementation of a previous DOC14 (prior to the one referred to above)---}
- 2001/1555 . . . . . {Counter electrode}
- 2001/1557 . . . . . {Side by side arrangements of working and counter electrodes}
- 1/157 . . . . . Structural association of cells with optical devices, e.g. reflectors or illuminating devices
- 1/161 . . . . . Gaskets; Spacers; Sealing of cells; Filling or closing of cells
- 1/163 . . . . . Operation of electrochromic cells, e.g. electrodeposition cells; Circuit arrangements therefor
- 2001/1635 . . . . . {the pixel comprises active switching elements, e.g. TFT}
- 2001/164 . . . . {the electrolyte is made of polymers}
- 1/165 . . . . based on translational movement of particles in a fluid under the influence of an applied field
- WARNING**
- Group [G02F 1/165](#) is incomplete pending reclassification of documents from groups [G02F 1/01](#), [G02F 1/17](#), and [G02F 1/19](#). All groups listed above should be considered in order to perform a complete search.
- 1/166 . . . . characterised by the electro-optical or magneto-optical effect
- WARNING**
- Group [G02F 1/166](#) is incomplete pending reclassification of documents from group [G02F 1/01](#), [G02F 1/17](#), and [G02F 1/19](#). All groups listed above should be considered in order to perform a complete search.
- 1/167 . . . . . by electrophoresis
- WARNING**
- Group [G02F 1/167](#) is impacted by reclassification into groups [G02F 1/1675](#), [G02F 1/16753](#), [G02F 1/16755](#), [G02F 1/16756](#), [G02F 1/16757](#), [G02F 1/1677](#), [G02F 1/1679](#), and [G02F 1/1685](#). All groups listed in this Warning should be considered in order to perform a complete search.
- 1/1671 . . . . . involving dry toners
- 1/1673 . . . . . by magnetophoresis
- WARNING**
- Group [G02F 1/1673](#) is incomplete pending reclassification of documents from group [G02F 1/01](#), [G02F 1/17](#), and [G02F 1/19](#). All groups listed above should be considered in order to perform a complete search.
- 1/1675 . . . . . Constructional details
- WARNING**
- Group [G02F 1/1675](#) is incomplete pending reclassification of documents from group [G02F 1/167](#), [G02F 1/17](#), and [G02F 1/19](#). All groups listed above should be considered in order to perform a complete search.
- 1/16753 . . . . . Structures for supporting or mounting cells, e.g. frames or bezels
- WARNING**
- Group [G02F 1/16753](#) is incomplete pending reclassification of documents from group [G02F 1/167](#), [G02F 1/17](#), and [G02F 1/19](#). All groups listed above should be considered in order to perform a complete search.



1/16755 . . . . Substrates

**WARNING**

Group [G02F 1/16755](#) is incomplete pending reclassification of documents from group [G02F 1/167](#), [G02F 1/17](#), and [G02F 1/19](#).

All groups listed above should be considered in order to perform a complete search.

1/16756 . . . . Insulating layers

**WARNING**

Group [G02F 1/16756](#) is incomplete pending reclassification of documents from group [G02F 1/167](#), [G02F 1/17](#), and [G02F 1/19](#).

All groups listed above should be considered in order to perform a complete search.

1/16757 . . . . Microcapsules

**WARNING**

Group [G02F 1/16757](#) is incomplete pending reclassification of documents from group [G02F 1/167](#), [G02F 1/17](#), and [G02F 1/19](#).

All groups listed above should be considered in order to perform a complete search.

1/1676 . . . . Electrodes

**WARNING**

Group [G02F 1/1676](#) is impacted by reclassification into groups [G02F 1/16761](#), [G02F 1/16762](#), and [G02F 1/16766](#).

All groups listed in this Warning should be considered in order to perform a complete search.

1/16761 . . . . Side-by-side arrangement of working electrodes and counter-electrodes

**WARNING**

Group [G02F 1/16761](#) is incomplete pending reclassification of documents from group [G02F 1/1676](#).

All groups listed above should be considered in order to perform a complete search.

1/16762 . . . . having three or more electrodes per pixel

**WARNING**

Group [G02F 1/16762](#) is incomplete pending reclassification of documents from group [G02F 1/1676](#).

All groups listed above should be considered in order to perform a complete search.

1/16766 . . . . for active matrices

**WARNING**

Group [G02F 1/16766](#) is incomplete pending reclassification of documents from group [G02F 1/1676](#).

All groups listed above should be considered in order to perform a complete search.

1/1677 . . . . Structural association of cells with optical devices, e.g. reflectors or illuminating devices

**WARNING**

Group [G02F 1/1677](#) is incomplete pending reclassification of documents from group [G02F 1/167](#), [G02F 1/17](#), and [G02F 1/19](#).

All groups listed above should be considered in order to perform a complete search.

2001/1678 . . . . {characterised by the composition or particle type}

1/1679 . . . . Gaskets; Spacers; Sealing of cells; Filling or closing of cells

**WARNING**

Group [G02F 1/1679](#) is incomplete pending reclassification of documents from group [G02F 1/167](#), [G02F 1/17](#), and [G02F 1/19](#).

All groups listed above should be considered in order to perform a complete search.

1/1681 . . . . having two or more microcells partitioned by walls, e.g. of microcup type

1/1685 . . . . Operation of cells; Circuit arrangements affecting the entire cell

**WARNING**

Group [G02F 1/1685](#) is incomplete pending reclassification of documents from group [G02F 1/167](#), [G02F 1/17](#), and [G02F 1/19](#).

All groups listed above should be considered in order to perform a complete search.

1/169 . . . based on orientable non-spherical particles having a common optical characteristic, e.g. suspended particles of reflective metal flakes

**WARNING**

Group [G02F 1/169](#) is incomplete pending reclassification of documents from groups [G02F 1/17](#) and [G02F 1/19](#).

All groups listed above should be considered in order to perform a complete search.

- 1/17 . . based on variable-absorption elements not provided for in groups [G02F 1/015](#) - [G02F 1/169](#)  
**WARNING**  
 Group [G02F 1/17](#) is impacted by reclassification into group [G02F 1/165](#), [G02F 1/166](#), [G02F 1/1673](#), [G02F 1/1675](#), [G02F 1/16753](#), [G02F 1/16755](#), [G02F 1/16756](#), [G02F 1/16757](#), [G02F 1/1677](#), [G02F 1/1679](#), [G02F 1/1685](#), [G02F 1/169](#).  
 All groups listed above should be considered in order to perform a complete search.
- 1/172 . . . {based on a suspension of orientable dipolar particles, e.g. suspended particles displays}
- 1/174 . . . {based on absorption band-shift, e.g. Stark - or Franz-Keldysh effect ([G02F 1/015](#), [G02F 1/178](#) take precedence)}
- 1/176 . . . {using acid- based indicators}
- 1/178 . . . {based on pressure effects ([G02F 1/195](#) takes precedence)}
- 1/19 . . based on variable-reflection or variable-refraction elements not provided for in groups [G02F 1/015](#) - [G02F 1/169](#)  
**WARNING**  
 Group [G02F 1/19](#) is impacted by reclassification into group [G02F 1/165](#), [G02F 1/166](#), [G02F 1/1673](#), [G02F 1/1675](#), [G02F 1/16753](#), [G02F 1/16755](#), [G02F 1/16756](#), [G02F 1/16757](#), [G02F 1/1677](#), [G02F 1/1679](#), [G02F 1/1685](#), [G02F 1/169](#).  
 All groups listed above should be considered in order to perform a complete search.
- 1/195 . . . {by using frustrated reflection (digital reflection using controlled total internal reflection [G02F 1/315](#))}
- 1/21 . . by interference
- 2001/211 . . . {Sagnac type}
- 2001/212 . . . {Mach-Zehnder type}
- 2001/213 . . . {Fabry-Perot type}
- 2001/215 . . . {Michelson type}
- 1/216 . . . {using liquid crystals, e.g. liquid crystal Fabry-Perot filters}
- 2001/217 . . . {Multi mode interference type}
- 1/218 . . . {using semi-conducting materials}
- 1/225 . . . in an optical waveguide structure
- 1/2252 . . . . {in optical fibres}
- 1/2255 . . . . {controlled by a high-frequency electromagnetic component in an electric waveguide structure}
- 1/2257 . . . . {the optical waveguides being made of semiconducting material}
- 1/23 . . for the control of the colour ([G02F 1/03](#) - [G02F 1/21](#) take precedence)
- 1/25 . . . as to hue or predominant wavelength
- 1/29 . . for the control of the position or the direction of light beams, i.e. deflection ({optical coupling means [G02B 6/26](#); optical-mechanical scanning in general [G02B 26/10](#) } ; static stores with electric or magnetic read-in and optical read-out [G11C](#); lasers provided with means to change the location from which, or the direction in which, laser radiation is emitted [H01S 3/101](#))
- 2001/291 . . {Two-dimensional analog deflection}
- 1/292 . . {by controlled diffraction or phased-array beam steering (controlled diffraction for optical switching [G02F 1/31](#))}
- 1/293 . . {by another light beam, i.e. opto-optical deflection}
- 2001/294 . . {Variable focal length device}
- 1/295 . . {Analog deflection from or} in an optical waveguide structure]
- 1/2955 . . . {by controlled diffraction or phased-array beam steering (controlled diffraction for optical waveguide switching [G02F 1/313](#))}
- 1/31 . . Digital deflection, {i.e. optical switching} ([G02F 1/33](#) takes precedence)
- 2001/311 . . . {Cascade arrangement of plural switches}
- 1/313 . . . in an optical waveguide structure
- 1/3131 . . . . {in optical fibres}
- 1/3132 . . . . {of directional coupler type (all-optical modulation, gating or switching using a non-linear directional coupler [G02F 1/3521](#))}
- 1/3133 . . . . . {the optical waveguides being made of semiconducting materials}
- 1/3134 . . . . . {controlled by a high-frequency electromagnetic wave component in an electric waveguide structure}
- 2001/3135 . . . . . {vertical structure}
- 1/3136 . . . . {of interferometric switch type}
- 1/3137 . . . . {with intersecting or branching waveguides, e.g. X-switches and Y-junctions}
- 1/3138 . . . . . {the optical waveguides being made of semiconducting materials}
- 1/315 . . . based on the use of controlled internal reflection
- 1/33 . . Acousto-optical deflection devices {(circuit or control arrangements therefor [G02F 1/113](#))}
- 1/332 . . . {comprising a plurality of transducers on the same crystal surface, e.g. multi-channel Bragg cell}
- 1/335 . . . having an optical waveguide structure
- 1/35 . . Non-linear optics (optical bistable devices [G02F 3/02](#); lasers using stimulated Brillouin or Raman effect [H01S 3/30](#))
- 1/3501 . . {Constructional arrangements of non-linear optical devices, e.g. shape of non-linear crystals (constructional arrangements of electro-optic devices [G02F 1/0305](#))}
- 2001/3503 . . . {Structural association of optical elements, e.g. lenses, with the nonlinear optical device}
- 2001/3505 . . . {Coatings; Housings; Supports}
- 2001/3507 . . . {Arrangements comprising two or more nonlinear optical devices}
- 2001/3509 . . . {Shape, e.g. shape of end face}
- 1/3511 . . {Self-focusing or self-trapping of light; Light-induced birefringence; Induced optical Kerr-effect (photorefractive effects of electro-optic crystals [G02F 1/0338](#), [G02F 1/0541](#), of ceramics [G02F 1/0558](#); opto-optical modulation [G02F 1/0126](#); opto-optical deflection [G02F 1/293](#))}
- 1/3513 . . . {Soliton propagation}
- 1/3515 . . {All-optical modulation, gating, switching, e.g. control of a light beam by another light beam ([G02F 1/353](#), [G02F 1/37](#), [G02F 1/39](#) take precedence)}

- 1/3517 . . . {using an interferometer}
- 1/3519 . . . . {of Sagnac type, i.e. nonlinear optical loop mirror [NOLM]}
- 1/3521 . . . {using a directional coupler}
- 1/3523 . . {Non-linear absorption changing by light, e.g. bleaching (laser Q-switching using bleachable media [H01S 3/113](#))}
- 1/3525 . . {Optical damage}
- 1/3526 . . {using two-photon emission or absorption processes ([Raman effect H01S 3/30](#))}
- 2001/3528 . . {for producing a supercontinuum}
- 1/353 . . {Frequency conversion, i.e. wherein a light beam with frequency components different from those of the incident light beams is generated (second harmonic generation [G02F 1/37](#); optical parametric generation or amplification [G02F 1/39](#); transferring the modulation of modulated light [G02F 2/004](#); optical pumping of a laser by another laser [H01S 3/094](#); nonlinear optical devices inside a laser cavity [H01S 3/108](#))}
- 1/3532 . . . {Arrangements of plural nonlinear devices for generating multi-colour light beams, e.g. arrangements of SHG, SFG, OPO devices for generating RGB light beams}
- 1/3534 . . . {Three-wave interaction, e.g. sum-difference frequency generation ([G02F 1/3532 takes precedence](#))}
- 1/3536 . . . {Four-wave interaction}
- 1/3538 . . . . {for optical phase conjugation ([H01S 3/10076 takes precedence](#))}
- 2001/354 . . . {Third or higher harmonic generation}
- 2001/3542 . . . {Multi-pass arrangements, i.e. arrangements to pass light a plurality of times through the same element, e.g. by using an enhancement cavity}
- 1/3544 . . . {Particular phase matching techniques}
- 2001/3546 . . . . {Active phase matching, e.g. by electro- or thermo-optic tuning}
- 2001/3548 . . . . {Quasi-phase-matching [QPM], e.g. using a periodic domain inverted structure}
- 1/355 . . characterised by the materials used
- 1/3551 . . . {Crystals}
- 1/3553 . . . . {having the formula  $MTiOYO_4$ , where  $M=K, Rb, TI, NH_4$  or  $Cs$  and  $Y=P$  or  $As$ , e.g. KTP}
- 1/3555 . . . {Glasses}
- 1/3556 . . . {Semiconductor materials, e.g. quantum wells}
- 1/3558 . . . {Poled materials, e.g. with periodic poling; Fabrication of domain inverted structures, e.g. for quasi-phase-matching [QPM]}
- 1/361 . . . Organic materials
- 1/3611 . . . . {containing Nitrogen}
- 1/3612 . . . . . {Heterocycles having N as heteroatom}
- 1/3613 . . . . . {containing Sulfur}
- 1/3614 . . . . . {Heterocycles having S as heteroatom}
- 1/3615 . . . . {containing polymers}
- 1/3616 . . . . . {having the non-linear optical group in the main chain}
- 1/3617 . . . . . {having the non-linear optical group in a side chain}
- 1/3618 . . . . {Langmuir Blodgett Films}
- 1/3619 . . . . {Organometallic compounds}
- 1/365 . . in an optical waveguide structure ([G02F 1/377](#), [G02F 1/395](#) take precedence)
- 1/37 . . for second-harmonic generation ([G02F 1/3532 takes precedence](#))}
- 2001/372 . . . {means for homogenizing the output beam}
- 2001/374 . . . {Cerenkov radiation}
- 1/377 . . . in an optical waveguide structure
- 1/3775 . . . . {with a periodic structure, e.g. domain inversion, for quasi-phase-matching [QPM] ([G02F 1/383 takes precedence](#))}
- 1/383 . . . . of the optical fibre type
- 1/39 . . for parametric generation or amplification of light, infra-red or ultra-violet waves ([G02F 1/3532 takes precedence](#); ) electrical parametric amplifiers [H03F 7/00](#))}
- 2001/392 . . . {Parametric amplification}
- 1/395 . . . {in optical waveguides}
- 1/397 . . . {Amplification of light by wave mixing involving an interference pattern, e.g. using photorefractive material}
- 2/00 Demodulating light; Transferring the modulation of modulated light; Frequency-changing of light** ([G02F 1/35 takes precedence](#); photoelectric detecting or measuring devices [G01J](#), [H01J 40/00](#), [H01L 31/00](#); demodulating laser arrangements {, e.g. switching, gating} [H01S 3/10](#); demodulation or transference of modulation of modulated electro-magnetic waves in general [H03D 9/00](#))
- 2/002 . {using optical mixing (homodyne, heterodyne systems [H04B 10/142](#))}
- 2/004 . {Transferring the modulation of modulated light, i.e. transferring the information from one optical carrier of a first wavelength to a second optical carrier of a second wavelength, e.g. all-optical wavelength converter}
- 2002/006 . . {All-optical wavelength conversion}
- 2002/008 . . {Opto-electronic wavelength conversion, i.e. involving photo-detection of the first optical carrier}
- 2/02 . Frequency-changing of light, e.g. by quantum counters ([luminescent materials C09K 11/00](#))
- 3/00 Optical logic elements** ({[optical computing G06E](#)}; electric pulse generators using opto-electronic devices as active elements [H03K 3/42](#); logic circuits using opto-electronic devices [H03K 19/14](#)); **Optical bistable devices**
- 3/02 . Optical bistable devices
- 3/022 . . {based on electro-, magneto- or acousto-optical elements ([G02F 3/028 takes precedence](#))}
- 3/024 . . {based on non-linear elements, e.g. non-linear Fabry-Perot cavity ([G02F 3/028 takes precedence](#))}
- 3/026 . . {based on laser effects}
- 3/028 . . {based on self electro-optic effect devices [SEED]}
- 7/00 Optical analogue/digital converters**
- NOTE**
- This group covers only converters based in substantial manner on elements which are provided for in group [G02F 1/00](#).
- 2201/00 **Constructional arrangements not provided for in groups [G02F 1/00](#) - [G02F 7/00](#)**
- 2201/02 . fibre

2201/04	. monomode	<b>2202/00</b>	<b>Materials and properties</b>
2201/05	. multimode	2202/01	. dipole
2201/06	. integrated waveguide	2202/02	. organic material
2201/063	. . ridge; rib; strip loaded	2202/021	. . low molecular weight
2201/066	. . channel; buried	2202/022	. . polymeric
2201/07	. buffer layer	2202/023	. . . curable
2201/08	. light absorbing layer	2202/025	. . . . thermocurable
2201/083	. . infra-red absorbing	2202/026	. . charge transfer complex
2201/086	. . UV absorbing	2202/027	. . Langmuir-Blodgett film
2201/12	. electrode	2202/028	. . photobleached
2201/121	. . common or background	2202/04	. dye
2201/122	. . having a particular pattern	2202/043	. . pleochroic
2201/123	. . pixel	2202/046	. . fluorescent
2201/124	. . interdigital	2202/06	. dopant
2201/125	. . delta-beta	2202/07	. poled
2201/126	. . push-pull	2202/08	. glass transition temperature
2201/127	. . travelling wave	2202/09	. inorganic glass
2201/128	. . field shaping	2202/10	. semiconductor
2201/14	. asymmetric	2202/101	. . Ga×As and alloy
2201/15	. periodic	2202/102	. . In×P and alloy
2201/16	. series; tandem	2202/103	. . a-Si
2201/17	. Multi-pass arrangements, i.e. arrangements to pass light a plurality of times through the same element, e.g. by using an enhancement cavity	2202/104	. . poly-Si
2201/18	. parallel	2202/105	. . single crystal Si
2201/20	. delay line	2202/106	. . Cd×Se or Cd×Te and alloys
2201/205	. . of fibre type	2202/107	. . Zn×S or Zn×Se and alloys
2201/30	. grating	2202/108	. . quantum wells
2201/302	. . grating coupler	2202/12	. photoconductor
2201/305	. . diffraction grating	2202/13	. photorefractive
2201/307	. . Reflective grating, i.e. Bragg grating	2202/14	. photochromic
2201/34	. reflector	2202/16	. conductive
2201/343	. . cholesteric liquid crystal reflector	2202/20	. LiNbO <sub>3</sub> , LiTaO <sub>3</sub>
2201/346	. . distributed (Bragg) reflector	2202/22	. Antistatic materials or arrangements
2201/36	. Airflow channels, e.g. constructional arrangements facilitating the flow of air	2202/28	. Adhesive materials or arrangements
2201/38	. Anti-reflection arrangements	2202/30	. Metamaterials
2201/40	. Arrangements for improving the aperture ratio	2202/32	. Photonic crystals
2201/42	. Arrangements for providing conduction through an insulating substrate	2202/34	. Metal hydrides materials
2201/44	. Arrangements combining different electro-active layers, e.g. electrochromic, liquid crystal or electroluminescent layers	2202/36	. Micro- or nanomaterials
2201/46	. Fixing elements	2202/38	. Sol-gel materials
2201/465	. . Snap -fit	2202/40	. Materials having a particular birefringence, retardation
2201/48	. Flattening arrangements	2202/42	. Materials having a particular dielectric constant
2201/50	. Protective arrangements	2202/99	. Test HW
2201/501	. . Blocking layers, e.g. against migration of ions	<b>2203/00</b>	<b>Function characteristic</b>
2201/503	. . Arrangements improving the resistance to shock	2203/01	. transmissive
2201/505	. . Arrangements improving the resistance to acoustic resonance like noise	2203/02	. reflective
2201/506	. . Repairing, e.g. with redundant arrangement against defective part	2203/023	. . total internal reflection
2201/508	. . . Pseudo repairing, e.g. a defective part is brought into a condition in which it does not disturb the functioning of the device	2203/026	. . attenuated or frustated internal reflection
2201/52	. RGB geometrical arrangements	2203/03	. scattering
2201/54	. Arrangements for reducing warping-twist	2203/04	. wavelength independent
2201/56	. Substrates having a particular shape, e.g. non-rectangular	2203/05	. wavelength dependent
2201/58	. Arrangements comprising a monitoring photodetector	2203/055	. . wavelength filtering
		2203/06	. Polarisation independent
		2203/07	. Polarisation dependent
		2203/09	. transfective
		2203/10	. plasmon
		2203/11	. involving infrared radiation
		2203/12	. spatial light modulator
		2203/13	. involving THZ radiation
		2203/15	. involving resonance effects, e.g. resonantly enhanced interaction
		2203/16	. involving spin polarization effects



## G02F

- 2203/17 . involving soliton waves
- 2203/18 . adaptive optics, e.g. wavefront correction
- 2203/19 . linearised modulation; reduction of harmonic distortions
- 2203/20 . Intrinsic phase difference, i.e. optical bias, of an optical modulator; Methods for the pre-set thereof
- 2203/21 . Thermal instability, i.e. DC drift, of an optical modulator; Arrangements or methods for the reduction thereof
- 2203/22 . diffractive
- 2203/24 . beam steering
- 2203/25 . Frequency chirping of an optical modulator; Arrangements or methods for the pre-set or tuning thereof
- 2203/255 . . Negative chirp
- 2203/26 . Pulse shaping; Apparatus or methods therefor
- 2203/28 . focussing or defocussing
- 2203/30 . Gray scale
- 2203/34 . Colour display without the use of colour mosaic filters
- 2203/48 . Variable attenuator
- 2203/50 . Phase-only modulation
- 2203/52 . Optical limiters
- 2203/54 . Optical pulse train (comb) synthesizer
- 2203/56 . Frequency comb synthesizer
- 2203/58 . Multi-wavelength, e.g. operation of the device at a plurality of wavelengths
- 2203/585 . . Add/drop devices
- 2203/60 . Temperature independent
- 2203/62 . Switchable arrangements whereby the element being usually not switchable
- 2203/64 . Normally black display, i.e. the off state being black
- 2203/66 . Normally white display, i.e. the off state being white
- 2203/68 . Green display, e.g. recycling, reduction of harmful substances
- 2203/69 . Arrangements or methods for testing or calibrating a device
- 2203/70 . Semiconductor optical amplifier [SOA] used in a device covered by [G02F](#)
- 2413/00 Indexing scheme related to [G02F 1/13363](#), i.e. to birefringent elements, e.g. for optical compensation, characterised by the number, position, orientation or value of the compensation plates**
- 2413/01 . Number of plates being 1
- 2413/02 . Number of plates being 2
- 2413/03 . Number of plates being 3
- 2413/04 . Number of plates greater than or equal to 4
- 2413/05 . Single plate on one side of the LC cell
- 2413/06 . Two plates on one side of the LC cell
- 2413/07 . All plates on one side of the LC cell
- 2413/08 . with a particular optical axis orientation
- 2413/09 . with a spatial distribution of the retardation value
- 2413/10 . with refractive index ellipsoid inclined, or tilted, relative to the LC-layer surface O plate
- 2413/105 . . with varying inclination in thickness direction, e.g. hybrid oriented discotic LC
- 2413/11 . The refractive index  $N_z$  perpendicular to the element surface being different from in-plane refractive indices  $N_x$  and  $N_y$ , e.g. C plate
- 2413/12 . Biaxial compensators
- 2413/13 . Positive birefringence
- 2413/14 . Negative birefringence
- 2413/15 . with twisted orientation, e.g. comprising helically oriented LC-molecules or a plurality of twisted birefringent sublayers