

## SECTION G — PHYSICS

## G02 OPTICS

**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; 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) [2, 4]

- 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) [2, 4]
- Note(s)**  
This group covers only:
- 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.
- 1/01 • for the control of the intensity, phase, polarisation or colour (G02F 1/29, G02F 1/35 take precedence; polarizing elements per se G02B 5/30; static storage per se G11C; image tube screens acting as light valves by shutter operation H01J 29/12; such screen acting by discoloration H01J 29/14) [2, 7]
- 1/015 • • based on semiconductor elements with at least one potential jump barrier, e.g. PN, PIN junction (G02F 1/03 takes precedence) [3]
- 1/017 • • • Structures with periodic or quasi periodic potential variation, e.g. superlattices, quantum wells [7]
- 1/025 • • • in an optical waveguide structure (G02F 1/017 takes precedence) [5, 7]
- 1/03 • • based on ceramics or electro-optical crystals, e.g. exhibiting Pockels or Kerr effect (G02F 1/061 takes precedence) [2, 4, 7]
- 1/035 • • • in an optical waveguide structure [5]
- 1/05 • • • with ferro-electric properties (G02F 1/035, G02F 1/055 take precedence) [2, 5]
- 1/055 • • • the active material being a ceramic (G02F 1/035 takes precedence) [4, 5]
- 1/061 • • based on electro-optical organic material (G02F 1/07 takes precedence) [7]
- 1/065 • • • in an optical waveguide structure [7]
- 1/07 • • based on electro-optical liquids exhibiting Kerr effect [2]
- 1/09 • • based on magneto-optical elements, e.g. exhibiting Faraday effect [2]
- 1/095 • • • in an optical waveguide structure [5]
- 1/11 • • based on acousto-optical elements, e.g. using variable diffraction by sound or like mechanical waves (acousto-optical deflection G02F 1/33) [2]
- 1/125 • • • in an optical waveguide structure [5]
- 1/13 • • based on liquid crystals, e.g. single liquid crystal display cells (liquid crystal materials C09K 19/00) [2]
- 1/133 • • • Constructional arrangements; Operation of liquid crystal cells; Circuit arrangements (arrangements or circuits for control of liquid crystal elements in a matrix, not structurally associated with these elements G09G 3/36) [3, 7]
- 1/1333 • • • • Constructional arrangements (G02F 1/135, G02F 1/136 take precedence) [5]
- 1/1334 • • • • • based on polymer-dispersed liquid crystals, e.g. microencapsulated liquid crystals [7]
- 1/1335 • • • • • Structural association of optical devices, e.g. polarisers, reflectors, with the cell [5]
- 1/13357 • • • • • Illuminating devices [7]

- 1/13363 • • • • • Birefringent elements, e.g. for optical compensation [7]
- 1/1337 • • • • • Surface-induced orientation of the liquid crystal molecules, e.g. by alignment layers [5]
- 1/1339 • • • • • Gaskets; Spacers; Sealing of the cell [5]
- 1/1341 • • • • • Filling or closing of the cell [5]
- 1/1343 • • • • • Electrodes [5]
- 1/1345 • • • • • Conductors connecting electrodes to cell terminals [5]
- 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 [5]
- 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 [3]
- 1/136 • • • • • Liquid crystal cells structurally associated with a semi-conducting layer or substrate, e.g. cells forming part of an integrated circuit (G02F 1/135 takes precedence) [5]
- 1/1362 • • • • • Active matrix addressed cells [7]
- 1/1365 • • • • • in which the switching element is a two-electrode device [7]
- 1/1368 • • • • • in which the switching element is a three-electrode device [7]
- 1/137 • • • characterised by a particular electro- or magneto-optical effect, e.g. field-induced phase transition, orientation effect, guest-host interaction, dynamic scattering [3]
- 1/139 • • • • • based on orientation effects in which the liquid crystal remains transparent [6]
- 1/141 • • • • • using ferroelectric liquid crystals [6]
- 1/15 • • based on electrochromic elements [5]
- 1/153 • • • Constructional arrangements [5]
- 1/155 • • • • • Electrodes [5]
- 1/157 • • • • • Structural association of optical devices, e.g. reflectors or illuminating devices, with the cell [5]
- 1/161 • • • • • Gaskets; Spacers; Sealing of the cell; Filling or closing of the cell [5]
- 1/163 • • • Operation of electrochromic cells; Circuit arrangements [5]
- 1/167 • • based on electrophoresis [5]
- 1/17 • • based on variable absorption elements (G02F 1/015-G02F 1/167 take precedence) [2, 5]
- 1/19 • • based on variable reflection or refraction elements (G02F 1/015-G02F 1/167 take precedence) [2, 5]
- 1/21 • • by interference [2]
- 1/225 • • • in an optical waveguide structure [5]
- 1/23 • • for the control of the colour (G02F 1/03-G02F 1/21 take precedence) [2]
- 1/25 • • • as to hue or predominant wavelength [2]
- 1/29 • • for the control of the position or the direction of light beams, i.e. deflection (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) [4]
- 1/295 • • in an optical waveguide structure (G02F 1/313, G02F 1/335 take precedence) [5]
- 1/31 • • Digital deflection devices (G02F 1/33 takes precedence) [2]
- 1/313 • • • in an optical waveguide structure [5]
- 1/315 • • • based on the use of controlled total internal reflection [3]
- 1/33 • • Acousto-optical deflection devices [2]
- 1/335 • • • having an optical waveguide structure [5]
- 1/35 • • Non-linear optics (optical bistable devices G02F 3/02; lasers using stimulated Brillouin or Raman effect H01S 3/30) [2, 5]
- 1/355 • • characterised by the materials used [7]
- 1/361 • • • Organic materials [7]
- 1/365 • • in an optical waveguide structure (G02F 1/377 takes precedence) [7]
- 1/37 • • for second-harmonic generation [2]
- 1/377 • • • in an optical waveguide structure [7]
- 1/383 • • • • of the optical fibre type [7]
- 1/39 • • for parametric generation or amplification of light, infra-red, or ultra-violet waves (electrical parametric amplifiers H03F 7/00) [2]
- 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 H01S 3/10; demodulation or transference of modulation of modulated electromagnetic waves in general H03D 9/00) [2]
- 2/02 • • Frequency-changing of light, e.g. by quantum counters (luminescent materials C09K 11/00) [2]
- 3/00 **Optical logic elements** (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** [5]
- 3/02 • • Optical bistable devices [5]
- 7/00 **Optical analogue/digital converters**  
**Note(s)**  
This group covers only converters based in substantial manner on elements which are provided for in group G02F 1/00.