# CPC COOPERATIVE PATENT CLASSIFICATION

## G03H HOLOGRAPHIC PROCESSES OR APPARATUS (holograms, e.g. point holograms, used as ordinary optical elements G02B 5/32; producing stereoscopic or other three-dimensional effects G02B 27/22; diffraction-grating systems G02B 27/44; systems using moirè fringes G02B 27/60; optical logic elements G02F 3/00; stereo-photography G03B 35/00; photosensitive materials or processes for photographic purposes G03C ; { stereo-photographic or similar processes G03C 9/00 }; apparatus for processing exposed photographic materials G03D ; analogue computers performing mathematical operations with the aid of optical elements G06E 3/00; authentication by radiation, of concealed information carried by holograms or diffraction gratings G06K 19/16; holographic storage G11B 7/0065, G11C 13/04; { stereoscopic or other three dimensional effects in television systems H04N 13/00 })

**NOTE**

This subclass covers means for producing a record of the phase and amplitude information of a wave-front, which information can be used to reconstruct the original wave-front, or means to reconstruct the original wave-front from a record containing the phase and amplitude information of the wave-front.

### G03H 1/00 Holographic processes or apparatus using light, infra-red or ultra-violet waves for obtaining holograms or for obtaining an image from them; Details peculiar thereto

G03H 1/0005 . { Adaptation of holography to specific applications (holographic optical element G02B 5/32; holographic scanner G02B 26/106; recognition using holographic mask G06K 9/76; holographic memories G11B 7/0065, G11C 13/042) }

G03H 1/0011 . . { for security or authentication (holograms on information-bearing cards B42D15 /10D; testing papers with holograms G07D 7/0013) }

G03H 1/02 . Details { of features involved during the holographic process; Replication of holograms without interference recording }

G03H 1/0236 . . { Form or shape of the hologram when not registered to the substrate, e.g. trimming the hologram to alphanumerical shape (substrates bearing a hologram G03H 1/0272) }

G03H 1/024 . . { Hologram nature or properties }

G03H 1/0244 . . . { Surface relief holograms (replicating hologram without interference recording G03H 1/0276) }

G03H 1/0248 . . . { Volume holograms }

G03H 1/0252 . . { Laminate comprising a hologram layer }

G03H 1/0256 . . . { having specific functional layer }

G03H 1/0272 . . { Substrate bearing the hologram }

G03H 1/0276 . . { Replicating a master hologram without interference recording (surface relief holograms G03H 1/0244) }

G03H 1/028 . . . { by embossing }

G03H 1/04 . Processes or apparatus for producing holograms (G03H 1/26 takes precedence)

G03H 1/0402 . . { Recording geometries or arrangements (G03H 1/0443, G03H 1/0476, G03H 1/16

take precedence) }

G03H 1/0404 . . . { In-line recording arrangement }

G03H 1/0406 . . . { Image plane or focused image holograms, i.e. an image of the object or holobject is formed on, in or across the recording plane }

G03H 1/0408 . . . { Total internal reflection [TIR] holograms, e.g. edge lit or substrate mode holograms }

G03H 1/041 . . . { Optical element in the object space affecting the object beam, not otherwise provided for }

G03H 1/0443 . . { Digital holography, i.e. recording holograms with digital recording means (holobject computation G03H 1/0866) }

G03H 1/0465 . . { Particular recording light; Beam shape or geometry (G03H 1/06 takes precedence) }

G03H 1/0476 . . { Holographic printer (G03H 1/268 takes precedence) }

G03H 1/0486 . . { Improving or monitoring the quality of the record, e.g. by compensating distortions, aberrations }

G03H 1/0493 . . { Special holograms not otherwise provided for, e.g. conoscopic, referenceless holography }

G03H 1/06 . . using incoherent light

G03H 1/08 . . Synthesising holograms, { i.e. holograms synthesized from objects or objects from holograms } (using electric digital computers G06F ; G06T )

G03H 1/0808 . . . { Methods of numerical synthesis, e.g. coherent ray tracing [CRT], diffraction specific }

G03H 1/0841 . . . { Encoding method mapping the synthesized field into a restricted set of values representative of the modulator parameters, e.g. detour phase coding }

G03H 1/0866 . . . { Digital holographic imaging, i.e. synthesizing holobjects from holograms }

G03H 1/0891 . . . { Processes or apparatus adapted to convert digital holographic data into a hologram (G03H 1/2294 takes precedence) }

G03H 1/10 . . using modulated reference beam

G03H 1/12 . . . Spatial modulation, e.g. ghost imaging

G03H 1/14 . . . Temporal modulation, e.g. extending depth of field or phase compensation for object motion

G03H 1/16 . . using Fourier transform ( { G03H 1/10 }, G03H 1/12, G03H 1/14 take precedence; analogue computers G06G , e.g. G06G 7/19)

G03H 1/18 . . Particular processing of hologram record carriers, e.g. for obtaining blazed holograms { (photographic processing in general G03C , G03D ) }

G03H 1/181 . . . { Pre-exposure processing, e.g. hypersensitisation }

G03H 1/182 . . . { Post-exposure processing, e.g. latensification }

G03H 1/20 . . Copying holograms by holographic { i.e. optical } means

G03H 1/202 . . . { Contact copy when the reconstruction beam for the master H1 also serves as reference beam for the copy H2 }

G03H 1/22 . Processes or apparatus for obtaining an optical image from holograms (G03H 1/26 to G03H 1/34 take precedence)

G03H 1/2202 . . { Reconstruction geometries or arrangements }

G03H 1/2205 . . . { using downstream optical component }

G03H 1/2249 . . { Holobject properties }

G03H 1/2286 . . { Particular reconstruction light (G03H 1/24 takes precedence) ; Beam properties }

G03H 1/2294 . . { Addressing the hologram to an active spatial light modulator }

G03H 1/24 . . using white light {e.g. rainbow holograms }

G03H 1/26 . Processes or apparatus specially adapted to produce multiple { sub- } holograms or to obtain images from them, e.g. multicolour technique

G03H 1/2645 . . { Multiplexing processes, e.g. aperture, shift, or wavefront multiplexing }

G03H 1/265 . . . { Angle multiplexing; Multichannel holograms (G03H 1/268 takes precedence) }

G03H 1/268 . . { Holographic stereogram }

G03H 1/28 . . superimposed holograms only

G03H 1/30 . . discrete holograms only

G03H 1/32 . Systems for obtaining speckle elimination

G03H 1/34 . Systems for reducing the space-spatial bandwidth product

**G03H 3/00** **Holographic processes or apparatus using ultrasonic, sonic or infrasonic waves for obtaining holograms; Processes or apparatus for obtaining an optical image from them** (G03H 1/22 takes precedence; { acoustic non-destructive testing using holographic methods G01N 29/0663; seismology using acoustic vibrations G01V 1/00; non-holographic methods for visualizing acoustic waves G10K 15/00 })

**G03H 5/00** **Holographic processes or apparatus using particles or using waves other than those covered by groups G03H 1/00 or G03H 3/00 for obtaining holograms; Processes or apparatus for obtaining an optical image from them** (G03H 1/22 takes precedence; construction of electron microscopes H01J 37/26; { investigating or analysing materials by the use of microwaves G01N 22/00, by the use of particles wave or X-rays G01N 23/00, G21K 7/00 })

**G03H 2001/00** **Holographic processes or apparatus using light, infra-red or ultra-violet waves for obtaining holograms or for obtaining an image from them; Details peculiar thereto**

G03H 2001/0005 . { Adaptation of holography to specific applications (holographic optical element G02B 5/32; holographic scanner G02B 26/106; recognition using holographic mask G06K 9/76; holographic memories G11B 7/0065, G11C 13/042) }

G03H 2001/0011 . . { for security or authentication (holograms on information-bearing cards B42D15/10D; testing papers with holograms G07D 7/0013) }

G03H 2001/0016 . . . Covert holograms or holobjects requiring additional knowledge to be perceived, e.g. holobject reconstructed only under IR illumination (micro-holograms G03H 2230/10)

G03H 2001/0022 . . . . Deciphering being performed with numerical or optical key, e.g. with the optical scrambler used during recording (optical element in object beam G03H 1/041)

G03H 2001/0027 . . . Being copy-protected against fraudulent replication, e.g. by layering a filter rejecting laser lines

G03H 2001/0033 . . in hologrammetry for measuring or analysing

G03H 2001/0038 . . . analogue or digital holobjects (holographic interferometry G01B 9/021; investigating particles G01N 15/0227)

G03H 2001/0044 . . . holographic fringes deformations; holographic sensors (holographic rain sensor in vehicles B60S 1/084)

G03H 2001/005 . . in microscopy, e.g. digital holographic microscope [DHM] (microscopes G02B 21/00; digital holography G03H 1/0866)

G03H 2001/0055 . . in advertising or decorative art

G03H 2001/0061 . . in haptic applications when the observer interacts with the holobject

G03H 2001/0066 . . for wavefront matching wherein the hologram is arranged to convert a predetermined wavefront into a comprehensive wave, e.g. associative memory (recognition using holographic masks G06K 9/76)

G03H 2001/0072 . . for wavefront conjugation wherein the hologram generates a wavefront conjugating a predetermined object, e.g. null testing, positioning, comparative holography

G03H 2001/0077 . . for optical manipulation, e.g. holographic optical tweezers [HOT]

G03H 2001/0083 . . for restoring distorted objects, e.g. restoring objects through scattering media

G03H 2001/0088 . . for video-holography, i.e. integrating hologram acquisition, transmission and display

G03H 2001/0094 . . for patterning or machining using the holobject as input light distribution (microlithography G03F 7/70283)

G03H 2001/02 . Details { of features involved during the holographic process; Replication of holograms without interference recording }

G03H 2001/0204 . . Object characteristics (corresponding details, see subgroups of G03H 2210/00)

G03H 2001/0208 . . Individual components other than the hologram

G03H 2001/0212 . . . Light sources or light beam properties (G03H 1/06, G03H 1/24 take precedence; corresponding details, see subgroups of G03H 2222/00)

G03H 2001/0216 . . . Optical components (G03H 2001/0224, G03H 1/0256 take precedence; corresponding details, see subgroups of G03H 2223/00)

G03H 2001/022 . . . Writing means other than actinic light wave (corresponding details, see subgroups of G03H 2224/00)

G03H 2001/0224 . . . Active addressable light modulator, i.e. Spatial Light Modulator [SLM] (corresponding details, see subgroups of G03H 2225/00)

G03H 2001/0228 . . . Electro-optic or electronic components relating to digital holography (G03H 2001/0224 takes precedence; corresponding details, see subgroups of G03H 2226/00)

G03H 2001/0232 . . . Mechanical components or mechanical aspects not otherwise provided for (corresponding details, see subgroups of G03H 2227/00)

G03H 2001/026 . . Recording materials or recording processes (G03H 2226/11 takes precedence; corresponding details, see subgroups of G03H 2260/00)

G03H 2001/0264 . . . Organic recording material

G03H 2001/0268 . . . Inorganic recording material, e.g. photorefractive crystal [PRC]

G03H 2001/0276 . . { Replicating a master hologram without interference recording (surface relief holograms G03H 1/0244) }

G03H 2001/0284 . . . by moulding

G03H 2001/0288 . . . by electroforming

G03H 2001/0292 . . . by masking

G03H 2001/0296 . . . Formation of the master hologram

G03H 2001/04 . Processes or apparatus for producing holograms (G03H 1/26 takes precedence)

G03H 2001/0402 . . { Recording geometries or arrangements (G03H 1/0443, G03H 1/0476, G03H 1/16 take precedence) }

G03H 2001/0413 . . . for recording transmission holograms

| | | |
|---|---|---|
| G03H 2001/0415 | . . . | for recording reflection holograms |
| G03H 2001/0417 | . . . . | for recording single beam Lippmann hologram wherein the object is illuminated by reference beam passing through the recording material |
| G03H 2001/0419 | . . . | for recording combined transmission and reflection holograms |
| G03H 2001/0421 | . . . | Parallax aspect |
| G03H 2001/0423 | . . . . | Restricted parallax, e.g. horizontal parallax only holograms [HPO] |
| G03H 2001/0426 | . . . . | Extended parallax, e.g. panoramic or 360deg. holograms |
| G03H 2001/0428 | . . . | Image holography, i.e. an image of the object or holobject is recorded (G03H 1/0406 takes precedence; holographic microscope G03H 2001/005) |
| G03H 2001/043 | . . . | Non planar recording surface, e.g. curved surface |
| G03H 2001/0432 | . . . | Constrained record wherein, during exposure, the recording means undergoes constrains substantially differing from those expected at reconstruction |
| G03H 2001/0434 | . . . | In situ recording when the hologram is recorded within the device used for reconstruction |
| G03H 2001/0436 | . . . | Holographic camera (portable device G03H 2227/02) |
| G03H 2001/0439 | . . . | for recording Holographic Optical Element [HOE] (HOE per se G02B 5/32) |
| G03H 2001/0441 | . . . | Formation of interference pattern, not otherwise provided for |
| G03H 2001/0443 | . . | { Digital holography, i.e. recording holograms with digital recording means (holobject computation G03H 1/0866) } |
| G03H 2001/0445 | . . . | Off-axis recording arrangement (G03H 2001/0456 takes precedence) |
| G03H 2001/0447 | . . . | In-line recording arrangement |
| G03H 2001/045 | . . . | Fourier or lensless Fourier arrangement |
| G03H 2001/0452 | . . . | arranged to record an image of the object (holographic microscope G03H 2001/005) |
| G03H 2001/0454 | . . . | Arrangement for recovering hologram complex amplitude |
| G03H 2001/0456 | . . . . | Spatial heterodyne, i.e. filtering a Fourier transform of the off-axis record |
| G03H 2001/0458 | . . . . | Temporal or spatial phase shifting, e.g. parallel phase shifting method |
| G03H 2001/046 | . . . | Synthetic aperture |
| G03H 2001/0463 | . . . | Frequency heterodyne, i.e. one beam is frequency shifted |
| G03H 2001/0465 | . . | { Particular recording light; Beam shape or geometry (G03H 1/06 takes precedence) } |
| G03H 2001/0467 | . . . | Gated recording using pulsed or low coherence light source, e.g. light in flight, first arriving light |
| G03H 2001/0469 | . . . | Object light being reflected by the object |
| G03H 2001/0471 | . . . | Object light being transmitted through the object, e.g. illumination through living cells |
| G03H 2001/0473 | . . . | Particular illumination angle between object or reference beams and hologram |
| G03H 2001/0476 | . . | { Holographic printer (G03H 1/268 takes precedence) } |
| G03H 2001/0478 | . . . | Serial printer i.e. point oriented processing |
| G03H 2001/048 | . . . | Parallel printer, i.e. a fringe pattern is reproduced |
| G03H 2001/0482 | . . . | Interference based printer |
| G03H 2001/0484 | . . . | Arranged to produce three-dimensional fringe pattern |
| G03H 2001/0486 | . . | { Improving or monitoring the quality of the record, e.g. by compensating distortions, aberrations } |
| G03H 2001/0489 | . . . | by using phase stabilized beam |

G03H 2001/0491 . . . by monitoring the hologram formation, e.g. via a feed-back loop

G03H 2001/0493 . . { Special holograms not otherwise provided for, e.g. conoscopic, referenceless holography }

G03H 2001/0495 . . . Polarisation preserving holography where amplitude, phase and polarisation state of the original objet wavefront are recorded

G03H 2001/0497 . . . Dot matrix holograms

G03H 2001/08 . . Synthesising holograms, { i.e. holograms synthesized from objects or objects from holograms } (using electric digital computers G06F ; G06T )

G03H 2001/0808 . . . { Methods of numerical synthesis, e.g. coherent ray tracing [CRT], diffraction specific }

G03H 2001/0816 . . . . Iterative algorithms

G03H 2001/0825 . . . . Numerical processing in hologram space, e.g. combination of the CGH [computer generated hologram] with a numerical optical element

G03H 2001/0833 . . . . Look up table

G03H 2001/0841 . . . { Encoding method mapping the synthesized field into a restricted set of values representative of the modulator parameters, e.g. detour phase coding }

G03H 2001/085 . . . . Kinoform, i.e. phase only encoding wherein the computed field is processed into a distribution of phase differences

G03H 2001/0858 . . . . Cell encoding wherein each computed values is represented by at least two pixels of the modulator, e.g. detour phase coding

G03H 2001/0866 . . . { Digital holographic imaging, i.e. synthesizing holobjects from holograms }

G03H 2001/0875 . . . . Solving phase ambiguity, e.g. phase unwrapping

G03H 2001/0883 . . . . Reconstruction aspect, e.g. numerical focusing

G03H 2001/18 . . Particular processing of hologram record carriers, e.g. for obtaining blazed holograms { (photographic processing in general G03C , G03D ) }

G03H 2001/182 . . . { Post-exposure processing, e.g. latensification }

G03H 2001/183 . . . . Erasing the holographic information

G03H 2001/184 . . . . . Partially erasing

G03H 2001/185 . . . Applying a curing step

G03H 2001/186 . . . Swelling or shrinking the holographic record or compensation thereof e.g. for controlling the reconstructed wavelength (G03H 2001/0033, G03H 2250/44 take precedence)

G03H 2001/187 . . . Trimming process i.e. macroscopically patterning the hologram (shape of hologram G03H 1/0236)

G03H 2001/188 . . . . Demetallisation, i.e. removing the enhancing metallic layer (enhancement layer G03H 2250/36)

G03H 2001/20 . . Copying holograms by holographic { i.e. optical } means

G03H 2001/205 . . . Subdivided copy, e.g. scanning transfer

G03H 2001/207 . . . with modification of the nature of the hologram, e.g. changing from volume to surface relief or from reflection to transmission

G03H 2001/22 . Processes or apparatus for obtaining an optical image from holograms (G03H 1/26 to G03H 1/34 take precedence)

G03H 2001/2202 . . { Reconstruction geometries or arrangements }

G03H 2001/2205 . . . { using downstream optical component }

G03H 2001/2207 . . . . Spatial filter, e.g. for suppressing higher diffraction orders

G03H 2001/221 . . . . Element having optical power, e.g. field lens

G03H 2001/2213 .... Diffusing screen revealing the real holobject, e.g. container filled with gel to reveal the 3D holobject
G03H 2001/2215 ..... Plane screen
G03H 2001/2218 ..... being perpendicular to optical axis
G03H 2001/2221 ..... Screen having complex surface, e.g. a structured object
G03H 2001/2223 ... Particular relationship between light source, hologram and observer
G03H 2001/2226 .... Edge lit holograms (TIR recording G03H 1/0408)
G03H 2001/2228 .... adapted for reflection and transmission reconstruction
G03H 2001/2231 .... Reflection reconstruction
G03H 2001/2234 .... Transmission reconstruction
G03H 2001/2236 ... Details of the viewing window
G03H 2001/2239 .... Enlarging the viewing window
G03H 2001/2242 .... Multiple viewing windows
G03H 2001/2244 ... Means for detecting or recording the holobject
G03H 2001/2247 .... for testing the hologram or holobject
G03H 2001/2249 .. { Holobject properties }
G03H 2001/2252 ... Location of the holobject
G03H 2001/2255 .... Holobject out of Fourier or hologram planes
G03H 2001/2257 .... Straddling the hologram
G03H 2001/226 .... Virtual or real
G03H 2001/2263 ... Multicoloured holobject
G03H 2001/2265 .... Achromatic holobject
G03H 2001/2268 .... Rainbow hologram
G03H 2001/2271 .... RGB holobject
G03H 2001/2273 ... Pseudo-dynamic holobject, e.g. due to angle multiplexing and viewer motion
G03H 2001/2276 ... Polarisation dependent holobject (G03H 2001/0495 takes precedence)
G03H 2001/2278 ... Orthoscopic or pseudoscopic
G03H 2001/2281 ... Particular depth of field
G03H 2001/2284 ... Superimposing the holobject with other visual information
G03H 2001/2286 .. { Particular reconstruction light (G03H 1/24 takes precedence) ; Beam properties }
G03H 2001/2289 ... when reconstruction wavelength differs form recording wavelength
G03H 2001/2292 ... Using scanning means
G03H 2001/2294 .. { Addressing the hologram to an active spatial light modulator }
G03H 2001/2297 ... using frame sequential, e.g. for reducing speckle noise

G03H 2001/26 . Processes or apparatus specially adapted to produce multiple { sub- } holograms or to obtain images from them, e.g. multicolour technique
G03H 2001/2605 .. Arrangement of the sub-holograms, e.g. partial overlapping
G03H 2001/261 ... in optical contact
G03H 2001/2615 .... in physical contact, i.e. layered holograms
G03H 2001/262 ... not in optical contact (G03H 1/30 takes precedence)
G03H 2001/2625 .. Nature of the sub-holograms
G03H 2001/263 ... Made of different recording materials

G03H 2001/2635 . . . Mixed volume and surface relief holograms
G03H 2001/264 . . . One hologram being a HOE
G03H 2001/2645 . . { Multiplexing processes, e.g. aperture, shift, or wavefront multiplexing }
G03H 2001/2655 . . . Time multiplexing, i.e. consecutive records wherein the period between records is pertinent per se
G03H 2001/266 . . . Wavelength multiplexing
G03H 2001/2665 . . . Coherence multiplexing wherein different holobjects are perceived under coherent or incoherent illumination
G03H 2001/267 . . . Polarisation multiplexing
G03H 2001/2675 . . . Phase code multiplexing, wherein the sub-holograms are multiplexed according to spatial modulation of the reference beam (reference beam spatial modulation G03H 1/12)
G03H 2001/268 . . { Holographic stereogram }
G03H 2001/2685 . . . One step recording process
G03H 2001/269 . . . Two and more than two steps recording process
G03H 2001/2695 . . . Dedicated printer (holographic printers G03H 1/0476)
G03H 2001/30 . . discrete holograms only
G03H 2001/303 . . . Interleaved sub-holograms, e.g. three RGB sub-holograms having interleaved pixels for reconstructing coloured holobject
G03H 2001/306 . . . Tiled identical sub-holograms

**G03H 2210/00** **Object characteristics** (not used, see subgroups)

G03H 2210/10 . Modulation characteristics, e.g. amplitude, phase, polarisation
G03H 2210/11 . . Amplitude modulating object
G03H 2210/12 . . Phase modulating object, e.g. living cell
G03H 2210/13 . . Coloured object

G03H 2210/20 . 2D object
G03H 2210/22 . . 2D SLM object wherein the object beam is formed of the light modulated by the SLM (SLM per se G03H 2001/0224)

G03H 2210/30 . 3D object
G03H 2210/32 . . 3D+2D, i.e. composition of 3D and 2D sub-objects, e.g. scene in front of planar background
G03H 2210/33 . . 3D/2D, i.e. the object is formed of stratified 2D planes, e.g. tomographic data
G03H 2210/36 . . Occluded features resolved due to parallax selectivity

G03H 2210/40 . Synthetic representation, i.e. digital or optical object decomposition
G03H 2210/42 . . from real object, e.g. using 3D scanner
G03H 2210/44 . . Digital representation
G03H 2210/441 . . . Numerical processing applied to the object data other than numerical propagation (synthesizing propagation G03H 1/0808)
G03H 2210/45 . . Representation of the decomposed object
G03H 2210/452 . . . into points
G03H 2210/454 . . . into planes

G03H 2210/46 . . for subsequent optical processing (G03H 1/268 takes precedence)

G03H 2210/50 . Nature of the object
G03H 2210/52 . . Alphanumerical
G03H 2210/53 . . Coded object not directly interpretable, e.g. encrypted object, barcode
G03H 2210/54 . . For individualisation of product
G03H 2210/55 . . Having particular size, e.g. irresolvable by the eye
G03H 2210/56 . . Multiple objects, e.g. each in different environment
G03H 2210/562 . . . Holographic object, i.e. a combination of an object and holobject (G03H 1/20 takes precedence)

G03H 2210/62 . Moving object

G03H 2210/63 . Environment affecting the recording, e.g. underwater (G03H 2001/0432 takes precedence)

**G03H 2222/00** **Light sources or light beam properties** (not used, see subgroups)

G03H 2222/10 . Spectral composition
G03H 2222/12 . . Single or narrow bandwidth source e.g. laser, light emitting diode [LED]
G03H 2222/13 . . Multi-wavelengths wave with discontinuous wavelength ranges (G03H 2222/18 takes precedence)
G03H 2222/14 . . Broadband source, e.g. sun light
G03H 2222/15 . . Ultra Violet [UV]
G03H 2222/16 . . Infra Red [IR]
G03H 2222/17 . . White light (G03H 1/24 takes precedence)
G03H 2222/18 . . . RGB trichrome light

G03H 2222/20 . Coherence of the light source
G03H 2222/22 . . Spatial coherence
G03H 2222/23 . . Temporal coherence
G03H 2222/24 . . Low coherence light normally not allowing valuable record or reconstruction (G03H 1/06 takes precedence)

G03H 2222/31 . Polarised light

G03H 2222/32 . Unpolarised light

G03H 2222/33 . Pulsed light beam

G03H 2222/34 . Multiple light sources

G03H 2222/35 . Transverse intensity distribution of the light beam

G03H 2222/36 . Scanning light beam

G03H 2222/40 . Particular irradiation beam not otherwise provided for
G03H 2222/42 . . Reference beam at recording stage

G03H 2222/43 . . Object beam at recording stage

G03H 2222/44 . . Beam irradiating the object at recording stage

G03H 2222/45 . . Interference beam at recording stage, i.e. following combination of object and reference beams

G03H 2222/46 . . Reconstruction beam at reconstruction stage

G03H 2222/47 . . Evanescent wave

G03H 2222/50 . Geometrical property of the irradiating beam

G03H 2222/52 . . Divergent beam

G03H 2222/53 . . Collimated beam

G03H 2222/54 . . Convergent beam

G03H 2222/55 . . Astigmatic beam having different focal planes (anamorphic optical element G03H 2223/21)

G03H 2222/56 . . Conjugated beam

**G03H 2223/00** **Optical components** (not used, see subgroups)

G03H 2223/12 . Amplitude mask, e.g. diaphragm, Louver filter

G03H 2223/13 . Phase mask

G03H 2223/14 . Diffuser, e.g. lens array, random phase mask

G03H 2223/15 . Colour filter, e.g. interferential colour filter

G03H 2223/16 . Optical waveguide, e.g. optical fibre, rod

G03H 2223/17 . Element having optical power

G03H 2223/18 . Prism

G03H 2223/19 . Micro-optic array e.g. lens array

G03H 2223/20 . Birefringent optical element, e.g. wave plate

G03H 2223/21 . Anamorphic optical element e.g. cylindrical (astigmatic beam G03H 2222/55)

G03H 2223/22 . Polariser

G03H 2223/23 . Diffractive element

G03H 2223/24 . Reflector; Mirror

G03H 2223/25 . Index matching material

G03H 2223/26 . Means providing optical delay e.g. for path length matching

G03H 2223/50 . Particular location or purpose of optical element (downstream optical component G03H 1/2205)

G03H 2223/52 . . Filtering the object information
G03H 2223/53 . . Filtering the hologram information, i.e. the fringe pattern
G03H 2223/54 . . Filtering the holobject information
G03H 2223/55 . . Arranged at a Fourier plane

**G03H 2224/00** **Writing means other than actinic light wave** (not used, see subgroups)

G03H 2224/02 . Mechanical means, e.g. diamond tool

G03H 2224/04 . Particle beam, e.g. e-beam

G03H 2224/06 . Thermal or photo-thermal means (infra red source G03H 2222/16)

**G03H 2225/00** **Active addressable light modulator** (not used, see subgroups)

G03H 2225/10 . Shape or geometry
G03H 2225/11 . . 1D SLM
G03H 2225/12 . . 2D SLM
G03H 2225/13 . . 3D SLM

G03H 2225/20 . Nature, e.g. e-beam addressed
G03H 2225/21 . . Acousto-optic SLM [AO-SLM]
G03H 2225/22 . . Electrically addressed SLM [EA-SLM]
G03H 2225/23 . . Grating based SLM
G03H 2225/24 . . Having movable pixels, e.g. micro-electromechanical systems [MEMS]
G03H 2225/25 . . Optically addressed SLM [OA-SLM]

G03H 2225/30 . Modulation
G03H 2225/31 . . Amplitude only
G03H 2225/32 . . Phase only
G03H 2225/33 . . Complex modulation
G03H 2225/34 . . . Amplitude and phase coupled modulation
G03H 2225/35 . . Colour modulation
G03H 2225/36 . . Polarisation

G03H 2225/52 . Reflective modulator

G03H 2225/55 . Having optical element registered to each pixel

G03H 2225/60 . Multiple SLMs
G03H 2225/61 . . for multicolour processing

**G03H 2226/00** **Electro-optic or electronic components relating to digital holography** (not used, see subgroups)

G03H 2226/02 . Computing or processing means, e.g. digital signal processor [DSP]

G03H 2226/04 . Transmission or communication means, e.g. internet protocol

G03H 2226/05 . Means for tracking the observer

G03H 2226/11 . Electro-optic recording means, e.g. CCD, pyroelectric sensors

G03H 2226/13 . . Multiple recording means

**G03H 2227/00** **Mechanical components or mechanical aspects not otherwise provided for** (not used, see subgroups)

G03H 2227/02 . Handheld portable device, e.g. holographic camera, mobile holographic display

G03H 2227/03 . Means for moving one component (G03H 1/0476, G03H 2001/2695 take precedence)

G03H 2227/04 . Production line for mass production

G03H 2227/05 . Support holding the holographic record

G03H 2227/06 . . Support including light source

**G03H 2230/00** **Form or shape of the hologram when not registered to the substrate** (not used, see subgroups)

G03H 2230/10 . Micro-hologram not registered to the substrate

**G03H 2240/00** **Hologram nature or properties** (not used, see subgroups)

G03H 2240/10 . Physical parameter modulated by the hologram (G03H 2001/0224 takes precedence)

G03H 2240/11 . . Phase only modulation (G03H 1/0244 takes precedence)

G03H 2240/12 . . Amplitude only modulation

G03H 2240/13 . . Amplitude and phase complex modulation

G03H 2240/15 . . Polarisation modulation

G03H 2240/20 . Details of physical variations exhibited in the hologram

G03H 2240/21 . . Optical density variations

G03H 2240/22 . . . Chromatic variations e.g. photochromic or electrochromic

G03H 2240/23 . . Optical length variations, e.g. bleached silver halide (G03H 1/0244 takes precedence)

G03H 2240/24 . . . Index variations only

G03H 2240/25 . . Magnetic variations

G03H 2240/26 . . Structural variations, e.g. structure variations due to photoanchoring or conformation variations due to photo-isomerisation

G03H 2240/40 . . Dynamic of the variations

G03H 2240/41 . . . Binary

G03H 2240/42 . . . Discrete level

G03H 2240/43 . . . Continuous

G03H 2240/50 . Parameters or numerical values associated with holography, e.g. peel strength
G03H 2240/51 . . Intensity, power or luminance (G03H 2240/52 takes precedence)
G03H 2240/52 . . Exposure parameters e.g. time, intensity
G03H 2240/53 . . Diffraction efficiency [DE]
G03H 2240/54 . . Refractive index
G03H 2240/55 . . Thickness
G03H 2240/56 . . Resolution
G03H 2240/61 . . SLM related parameters, e.g. pixel size
G03H 2240/62 . . Sampling aspect applied to sensor or display

**G03H 2250/00** **Laminate comprising a hologram layer** (not used, see subgroups)

G03H 2250/10 . arranged to be transferred onto a carrier body (adhesive layer G03H 2250/35)
G03H 2250/12 . Special arrangement of layers
G03H 2250/14 . Forming layer onto which a surface relief hologram is formed (G03H 2270/52 takes precedence)
G03H 2250/32 . Antireflective layer
G03H 2250/33 . Absorbing layer
G03H 2250/34 . Colour layer
G03H 2250/35 . Adhesive layer
G03H 2250/36 . Conform enhancement layer
G03H 2250/37 . Enclosing the photosensitive material
G03H 2250/38 . Liquid crystal
G03H 2250/39 . Protective layer
G03H 2250/40 . Printed information overlapped with the hologram
G03H 2250/41 . Polarisation active layer
G03H 2250/42 . Reflective layer (G03H 2250/36 takes precedence)
G03H 2250/43 . One layer having dispersed particles (S02H 260/33 takes precedence)
G03H 2250/44 . Colour tuning layer

**G03H 2260/00** **Recording materials or recording processes** (not used, see subgroups)

G03H 2260/10 . Dichromated gelatine or equivalents

G03H 2260/12 . Photopolymer

G03H 2260/14 . Photoresist

G03H 2260/16 . Silver halide emulsion

G03H 2260/30 . Details of photosensitive recording material not otherwise provided for
G03H 2260/31 . . Ageing or resistance of the material (G03H 2250/39 takes precedence)
G03H 2260/32 . . Combining different recording materials (G03H 2001/2615 takes precedence)
G03H 2260/33 . . Having dispersed compound
G03H 2260/34 . . Non uniform thickness
G03H 2260/35 . . Rewritable material allowing several record and erase cycles
G03H 2260/36 . . . Dynamic material where the lifetime of the recorded pattern is quasi instantaneous, the holobject is simultaneously reconstructed

G03H 2260/50 . Reactivity or recording processes (writing means G03H 2001/0212, G03H 2001/022)
G03H 2260/51 . . Photoanisotropic reactivity wherein polarized light induces material birefringence, e.g. azo-dye doped polymer
G03H 2260/52 . . Photochromic reactivity wherein light induces a reversible transformation between two states having different absorption spectra
G03H 2260/53 . . Photoconductor thermoplastic reactivity wherein light is transformed into an electrostatic then into a thickness distribution
G03H 2260/54 . . Photorefractive reactivity wherein light induces photo-generation, redistribution and trapping of charges then a modification of refractive index, e.g. photorefractive polymer
G03H 2260/61 . . Producing material deformation
G03H 2260/62 . . Direct etching
G03H 2260/63 . . Indirect etching, e.g. lithography (photoresist G03H 2260/14)

**G03H 2270/00** **Substrate bearing the hologram** (not used, see subgroups)

G03H 2270/10 . Composition
G03H 2270/11 . . Crystal or glass (G03H 2270/55 takes precedence )
G03H 2270/12 . . Fibrous, e.g. paper, textile
G03H 2270/13 . . Metallic
G03H 2270/14 . . Plastic

G03H 2270/20 . Shape
G03H 2270/21 . . Curved bearing surface
G03H 2270/22 . . Disc shaped
G03H 2270/23 . . Ribbon shaped, e.g. holographic foil
G03H 2270/24 . . Having particular size, e.g. microscopic

G03H 2270/30 . Nature
G03H 2270/31 . . Flexible
G03H 2270/32 . . Transparent

G03H 2270/52 . Integrated surface relief hologram without forming layer

G03H 2270/53 . Recording material dispersed into porous substrate

G03H 2270/54 . Recording material filed in recessed substrate

G03H 2270/55 . being an optical element, e.g. spectacles