

**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 moiré 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 [B42D 15/10D](#); 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. conosopic, 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 [B42D 15/10D](#); 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<br>( <a href="#">G03H 1/0406</a> takes precedence; holographic microscope <a href="#">G03H 2001/005</a> ) |
| G03H 2001/043  | ...  | Non planar recording surface, e.g. curved surface  |
| G03H 2001/0432 | ...  | Constrained record wherein, during exposure, the recording means undergoes constraints 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 ( <a href="#">portable device G03H 2227/02</a> )  |
| G03H 2001/0439 | ...  | for recording Holographic Optical Element [HOE] ( <a href="#">HOE per se G02B 5/32</a> )   |
| G03H 2001/0441 | ...  | Formation of interference pattern, not otherwise provided for  |
| G03H 2001/0443 | ..   | { <a href="#">Digital holography, i.e. recording holograms with digital recording means ( holobject computation G03H 1/0866 )</a> }  |
| G03H 2001/0445 | ...  | Off-axis recording arrangement ( <a href="#">G03H 2001/0456</a> 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 ( <a href="#">holographic microscope G03H 2001/005</a> )   |
| 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 | ..   | { <a href="#">Particular recording light; Beam shape or geometry ( G03H 1/06 takes precedence )</a> }  |
| 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 | ..   | { <a href="#">Holographic printer ( G03H 1/268 takes precedence )</a> }  |
| 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 | ..   | { <a href="#">Improving or monitoring the quality of the record, e.g. by compensating distortions, aberrations</a> }   |
| G03H 2001/0489 | ...  | by using phase stabilized beam   |

|                                |       |   |
|--------------------------------|-------|---|
| <a href="#">G03H 2001/0491</a> | ...   | by monitoring the hologram formation, e.g. via a feed-back loop   |
| <a href="#">G03H 2001/0493</a> | ..    | { <a href="#">Special holograms not otherwise provided for, e.g. conoscopic, referenceless holography</a> }   |
| <a href="#">G03H 2001/0495</a> | ...   | Polarisation preserving holography where amplitude, phase and polarisation state of the original objet wavefront are recorded   |
| <a href="#">G03H 2001/0497</a> | ...   | Dot matrix holograms  |
| <a href="#">G03H 2001/08</a>   | ..    | Synthesising holograms, { <a href="#">i.e. holograms synthesized from objects or objects from holograms</a> } ( <a href="#">using electric digital computers <a href="#">G06F</a>; <a href="#">G06T</a></a> ) |
| <a href="#">G03H 2001/0808</a> | ...   | { <a href="#">Methods of numerical synthesis, e.g. coherent ray tracing [CRT], diffraction specific</a> }   |
| <a href="#">G03H 2001/0816</a> | ....  | Iterative algorithms  |
| <a href="#">G03H 2001/0825</a> | ....  | Numerical processing in hologram space, e.g. combination of the CGH [computer generated hologram] with a numerical optical element  |
| <a href="#">G03H 2001/0833</a> | ....  | Look up table   |
| <a href="#">G03H 2001/0841</a> | ...   | { <a href="#">Encoding method mapping the synthesized field into a restricted set of values representative of the modulator parameters, e.g. detour phase coding</a> }  |
| <a href="#">G03H 2001/085</a>  | ....  | Kinoform, i.e. phase only encoding wherein the computed field is processed into a distribution of phase differences   |
| <a href="#">G03H 2001/0858</a> | ....  | Cell encoding wherein each computed values is represented by at least two pixels of the modulator, e.g. detour phase coding   |
| <a href="#">G03H 2001/0866</a> | ...   | { <a href="#">Digital holographic imaging, i.e. synthesizing holobjects from holograms</a> }  |
| <a href="#">G03H 2001/0875</a> | ....  | Solving phase ambiguity, e.g. phase unwrapping  |
| <a href="#">G03H 2001/0883</a> | ....  | Reconstruction aspect, e.g. numerical focusing  |
| <a href="#">G03H 2001/18</a>   | ..    | Particular processing of hologram record carriers, e.g. for obtaining blazed holograms { ( <a href="#">photographic processing in general <a href="#">G03C</a>, <a href="#">G03D</a></a> ) }                  |
| <a href="#">G03H 2001/182</a>  | ...   | { <a href="#">Post-exposure processing, e.g. latensification</a> }  |
| <a href="#">G03H 2001/183</a>  | ....  | Erasing the holographic information   |
| <a href="#">G03H 2001/184</a>  | ..... | Partially erasing   |
| <a href="#">G03H 2001/185</a>  | ...   | Applying a curing step  |
| <a href="#">G03H 2001/186</a>  | ...   | Swelling or shrinking the holographic record or compensation thereof e.g. for controlling the reconstructed wavelength ( <a href="#">G03H 2001/0033</a> , <a href="#">G03H 2250/44 take precedence</a> )      |
| <a href="#">G03H 2001/187</a>  | ...   | Trimming process i.e. macroscopically patterning the hologram ( <a href="#">shape of hologram <a href="#">G03H 1/0236</a></a> )   |
| <a href="#">G03H 2001/188</a>  | ....  | Demetallisation, i.e. removing the enhancing metallic layer ( <a href="#">enhancement layer <a href="#">G03H 2250/36</a></a> )  |
| <a href="#">G03H 2001/20</a>   | ..    | Copying holograms by holographic { <a href="#">i.e. optical</a> } means   |
| <a href="#">G03H 2001/205</a>  | ...   | Subdivided copy, e.g. scanning transfer   |
| <a href="#">G03H 2001/207</a>  | ...   | with modification of the nature of the hologram, e.g. changing from volume to surface relief or from reflection to transmission   |
| <a href="#">G03H 2001/22</a>   | .     | Processes or apparatus for obtaining an optical image from holograms ( <a href="#">G03H 1/26 to <a href="#">G03H 1/34 take precedence</a></a> )   |
| <a href="#">G03H 2001/2202</a> | ..    | { <a href="#">Reconstruction geometries or arrangements</a> }   |
| <a href="#">G03H 2001/2205</a> | ...   | { <a href="#">using downstream optical component</a> }  |
| <a href="#">G03H 2001/2207</a> | ....  | Spatial filter, e.g. for suppressing higher diffraction orders  |
| <a href="#">G03H 2001/221</a>  | ....  | 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 ( <a href="#">TIR recording G03H 1/0408</a> )  |
| 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 | ..    | { <a href="#">Holobject properties</a> }  |
| 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 ( <a href="#">G03H 2001/0495 takes precedence</a> )  |
| 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 | ..    | { <a href="#">Particular reconstruction light ( G03H 1/24 takes precedence )</a> ; <a href="#">Beam properties</a> }                                      |
| G03H 2001/2289 | ...   | when reconstruction wavelength differs from recording wavelength  |
| G03H 2001/2292 | ...   | Using scanning means  |
| G03H 2001/2294 | ..    | { <a href="#">Addressing the hologram to an active spatial light modulator</a> }  |
| G03H 2001/2297 | ...   | using frame sequential, e.g. for reducing speckle noise   |
| G03H 2001/26   | .     | Processes or apparatus specially adapted to produce multiple { <a href="#">sub-</a> } 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 ( <a href="#">G03H 1/30 takes precedence</a> )   |
| 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 hologram 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