

## 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 30/00](#); 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](#)})

### Definition statement

*This place covers:*

- Means for and process of producing a numerical or analogical record of the phase and amplitude information of an object wave-front, e.g. by recording the interference pattern between a reference wavefront and the object wavefront;
- Hologram produced by the above process;
- Means for and process of reconstructing a holobject wave-front by optical or numerical diffraction from a hologram.
- The three main groups [G03H 1/00](#), [G03H 3/00](#), [G03H 5/00](#) relate each to different kind of waves : visible and near visible waves in [G03H 1/00](#); acoustic waves in [G03H 3/00](#) and other waves in [G03H 5/00](#);

Main groups [G03H 3/00](#) and [G03H 5/00](#) are considered as marker for tagging the wave used, whatever the wave, detailed classes are given under subgroups of [G03H 1/00](#).

- The large majority of application being limited to the field of optical holography, applications of holography are classified under [G03H 1/00](#).

### Relationships with other classification places

Holography is a basic technology which developed in numerous application areas. A primary advantage of processing phase and amplitude information of an object wavefront is the ability of holography to reconstruct a 3D holobject from a recorded 3D object.

Whatever the application, [G03H](#) classification symbols are given for remaining pertinent holographic aspects.

### References

#### Application-oriented references

*Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:*

in lithography systems	<a href="#">B23K 26/06</a> , <a href="#">G03F 7/70283</a>
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for authentication and security as covert or overt features	<a href="#">B41M 3/14</a> , <a href="#">B42D 25/29</a> , <a href="#">B42D 25/328</a> , <a href="#">B44F 1/10</a> , <a href="#">B65D 55/026</a> , <a href="#">D21F 1/44</a> , <a href="#">D21H 21/40</a> , <a href="#">G06K 7/10</a> , <a href="#">G06V 10/10</a> , <a href="#">G06K 19/16</a> , <a href="#">G07D 7/0032</a> , <a href="#">G09C 5/00</a> , <a href="#">H04K 1/00</a> , <a href="#">H04L 9/00</a> , <a href="#">H04L 63/08</a>
in advertising, decorative arts	<a href="#">B44F 1/00</a> , <a href="#">B44F 7/00</a> , <a href="#">E01F 9/00</a> , <a href="#">G09F 13/02</a> , <b><a href="#">G03F13/04</a></b> , <a href="#">G09F 19/00</a>
for recording or reconstructing three dimensional information	<a href="#">B44F 7/00</a> , <a href="#">G02B 30/00</a>
in interferometry systems	<a href="#">G01B 9/021</a> , <a href="#">G01B 11/162</a> , <a href="#">G01M 17/027</a> , <a href="#">G01N 21/453</a>
for metrology	<a href="#">G01B 11/00</a> , <a href="#">G01N 21/453</a>
in alignment or positioning systems	<a href="#">G01B 11/02</a> , <a href="#">G01D 5/38</a> , <a href="#">G03F 9/00</a>
for particle velocimetry	<a href="#">G01N 15/0227</a> , <a href="#">G01P 5/001</a> , <a href="#">G01P 5/26</a>
restoring distorted objects	<a href="#">G01N 21/4795</a>
in acousto-phonic systems	<a href="#">G01N 29/0663</a>
as holographic diffractive optical elements	<a href="#">G02B 5/32</a>
for routing	<a href="#">G02B 6/4204</a> , <a href="#">H04Q 3/526</a>
in microscopy systems	<a href="#">G02B 21/00</a>
in manipulation systems. e.g. Holographic tweezer	<a href="#">G02B 21/32</a> , <a href="#">G21K 1/00</a> , <a href="#">H05H 3/04</a>
in scanner systems	<a href="#">G02B 26/106</a> , <a href="#">G06K 7/10663</a>
as holographic optical element in head up displays	<a href="#">G02B 27/0103</a> , <a href="#">G02B 27/0172</a>
for information processing	<a href="#">G02F 3/00</a> , <a href="#">G06E 3/001</a> , <a href="#">G06N 3/067</a>
in haptic computer interfaces	<a href="#">G06F 3/011</a>
in correlator systems	<a href="#">G06V 10/88</a>
in holographic storage systems	<a href="#">G11B 7/0065</a> , <a href="#">G11C 13/042</a>
in video-holography	<a href="#">H04N 5/89</a>

## Glossary of terms

*In this place, the following terms or expressions are used with the meaning indicated:*

2D	Two dimensional
3D	Three dimensional

Holobject	Object issued from the wavefront diffractively reconstructed (to be opposed to the object generating the wavefront holographically recorded)
Parallactic	Related to parallax e.g. parallactic decomposition stands for : decomposition of a 3D object into a set of 2D pictures obtained with various recording angle or line of sight

## Synonyms and Keywords

*In patent documents, the following abbreviations are often used:*

CGH	Computer Generated Hologram
HOT	Holographic Optical Tweezer
SLM	Spatial Light Modulator

## G03H 1/00

**Holographic processes or apparatus using light, infrared or ultraviolet waves for obtaining holograms or for obtaining an image from them; Details peculiar thereto**

### Definition statement

*This place covers:*

Holography using optical waves i.e. electromagnetic radiations within the range of visible or near to visible (i.e. infrared, ultraviolet);

Applications wherein holography is an appropriate solution to a particular problem;

Systems for obtaining speckle reduction at recording or reconstruction; also applies to speckle reduction involved in numerical holography;

Systems for reducing the "space" x "spatial bandwidth" product; wherein the "space" measures the size of the hologram, the "spatial bandwidth" measures the "density" of holographic element, and the product reflects the total number of holographic elements forming the hologram; example : "horizontal parallax only" holograms comprise quasi-1D pertinent holographic information.

## References

### Limiting references

*This place does not cover:*

Interferometers using holographic techniques	<a href="#">G01B 9/021</a>
Holograms used as optical elements	<a href="#">G02B 5/32</a>
Holographic scanners	<a href="#">G02B 26/106</a>
Holographic optical element in head up displays	<a href="#">G02B 27/0103</a>
Arrangements for recognition printed or written characters using holographic masks	<a href="#">G06V 10/88</a>
Recording, reproducing or erasing by using optical interference patterns, e.g. holograms	<a href="#">G11B 7/0065</a> , <a href="#">G11C 13/042</a>

**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Shaping the laser beam for laser beam working	<a href="#">B23K 26/06</a>
Security printing	<a href="#">B41M 3/14</a>
Security printed matter on banknotes	<a href="#">B42D 25/29</a>
Information-bearing cards with holograms	<a href="#">B42D 25/328</a>
Designs or pictures characterised by special or unusual light effects	<a href="#">B44F 1/00</a>
Secret pictures	<a href="#">B44F 1/00</a>
Designs imitating three-dimensional effects	<a href="#">B44F 7/00</a>
Cleaning vehicle's windows using holographic sensor	<a href="#">B60S 1/084</a>
Container closure with temper indication	<a href="#">B65D 55/026</a>
Watermarking on paper	<a href="#">D21F 1/44</a>
Security element added to paper	<a href="#">D21H 21/40</a>
Arrangement of road signs or traffic signals	<a href="#">E01F 9/00</a>
Refractor for light source using hologram	<a href="#">F21V 5/002</a>
Measuring arrangements using optical means	<a href="#">G01B 11/00</a>
Measuring deformation in a solid by holographic interferometry	<a href="#">G01B 11/164</a>
Sensing comprising diffraction grating	<a href="#">G01D 5/38</a>
Testing tyres using holography	<a href="#">G01M 17/027</a>
Holography used to investigate particles	<a href="#">G01N 15/0205</a>
Holographic interferometry used to investigate materials	<a href="#">G01N 21/453</a>
Investigating or analysing materials by optical diffraction	<a href="#">G01N 21/4788</a>
Spatially resolving object in scattering medium	<a href="#">G01N 21/4795</a>
Flow measurement of fluid	<a href="#">G01P 5/001</a> , <a href="#">G01P 5/26</a>
Diffraction gratings	<a href="#">G02B 5/18</a>
Coupling light guides with holograms	<a href="#">G02B 6/4204</a>
Microscopes	<a href="#">G02B 21/00</a>
Micromanipulators structurally combined with microscopes	<a href="#">G02B 21/32</a>
Diffraction optics	<a href="#">G02B 27/42</a>
Systems using moiré fringes	<a href="#">G02B 27/60</a>
Systems for producing stereoscopic or 3D effects	<a href="#">G02B 30/00</a>
Optical logic element	<a href="#">G02F 3/00</a>
Imaging mask onto workpiece in microlithography	<a href="#">G03F 7/70283</a>
Registration or positioning	<a href="#">G03F 9/00</a>
Analogue computers performing mathematical operations with the aid of optical elements	<a href="#">G06E 3/00</a>
Haptic computer interface	<a href="#">G06F 3/011</a>
Optical sensing of record carrier using holographic scanner	<a href="#">G06K 7/10663</a>
Machine authentication of record carrier comprising hologram marking	<a href="#">G06K 19/16</a>
image acquisition of printed or written character or pattern	<a href="#">G06V 10/10</a>

Testing holographic security marking	<a href="#">G07D 7/0032</a>
Ciphering of e.g. graphic data	<a href="#">G09C 5/00</a>
Luminous advertising illuminated in front of the insignia	<a href="#">G09F 13/02</a>
Luminous advertising illuminated behind the insignia	<a href="#">G09F 13/04</a>
Miscellaneous advertising or display means	<a href="#">G09F 19/00</a>
Arrangements for handling particles	<a href="#">G21K 1/00</a>
secret communication	<a href="#">H04K 1/00</a> , <a href="#">H04L 9/00</a>
Television using holographic recording	<a href="#">H04N 5/89</a>
Optical switching systems	<a href="#">H04Q 3/526</a>
micromanipulation of neutral particle beams	<a href="#">H05H 3/04</a>

### Special rules of classification

Holographic optical elements (HOEs, DOEs) are particular holograms wherein the holobject is a simple optical function (e.g. lens, mirror). Per se, HOEs are classified in [G02B 5/32](#), however, their production is classified under [G03H 1/04](#) (analogical record) or [G03H 1/08](#) (digital record).

### Glossary of terms

*In this place, the following terms or expressions are used with the meaning indicated:*

Hologrametry	Dimensional and /or index measurement performed on the (optically or numerically) reconstructed holobject
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### Synonyms and Keywords

*In patent documents, the following abbreviations are often used:*

DOE	Diffraction Optical Element
HDG	Holographic Diffraction Grating
HOE	Holographic Optical Element
HPO	Horizontal parallax only

### G03H 2001/0016

**{Covert holograms or holobjects requiring additional knowledge to be perceived, e.g. holobject reconstructed only under IR illumination}**

### References

#### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Microhologram not registered to the substrate	<a href="#">G03H 2230/10</a>
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**G03H 2001/0022**

{Deciphering being performed with numerical or optical key, e.g. with the optical scrambler used during recording}

**References****Informative references**

*Attention is drawn to the following places, which may be of interest for search:*

Processes or apparatus for producing holograms with optical element in the object space affecting the object beam	<a href="#">G03H 1/041</a>
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**G03H 2001/0038**

{analogue or digital holobjects}

**References****Informative references**

*Attention is drawn to the following places, which may be of interest for search:*

Interferometers using holographic techniques	<a href="#">G01B 9/021</a>
Investigating particles by optical means, using imaging	<a href="#">G01N 15/0227</a>

**G03H 2001/0044**

{holographic fringes deformations; holographic sensors}

**References****Informative references**

*Attention is drawn to the following places, which may be of interest for search:*

Wipers with optical rain sensor including a hologram	<a href="#">B60S 1/084</a>
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**G03H 2001/005**

{in microscopy, e.g. digital holographic microscope [DHM]}

**References****Informative references**

*Attention is drawn to the following places, which may be of interest for search:*

Digital holographic imaging	<a href="#">G03H 1/0866</a>
Microscopes	<a href="#">G02B 21/00</a>

**G03H 2001/0066**

**{for wavefront matching wherein the hologram is arranged to convert a predetermined wavefront into a comprehensive wave, e.g. associative memory}**

**References****Informative references**

*Attention is drawn to the following places, which may be of interest for search:*

Image or video recognition using optical means, e.g. holographic masks	<a href="#">G06V 10/88</a>
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**G03H 2001/0094**

**{for patterning or machining using the holobject as input light distribution}**

**References****Informative references**

*Attention is drawn to the following places, which may be of interest for search:*

Mask effects on the imaging process of microphotolithographic exposure	<a href="#">G03F 7/70283</a>
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**G03H 1/02**

**Details {of features involved during the holographic process; Replication of holograms without interference recording}**

**Definition statement**

*This place covers:*

- Isolated features involved during the holographic process (recording or reconstruction):

Recording material adapted to record holographic information:

organic material (e.g. Photopolymer, dichromated gelatine, Photoresists, Silver halide);

inorganic material (e.g. photorefractive crystal)

other recording means (e.g. CCD);

Details associated with the holographic record:

physical distribution storing in the hologram a print of the recorded interference pattern (variations of size, density, strength, charge, ...);

physical parameter affected when a reconstruction wave interacts with the hologram (amplitude, phase or polarisation variations);

nature of the holographic medium (e.g. thin, thick, volume holograms); dynamic of the variations (binary, discrete, continuous);

ageing and resistance of the material;

non-uniform thickness;

compound included into actinic material;

## Definition statement

Mechanical aspect when related to holograms:

production line;

portable or mobile device;

moving component;

Involving specific optical component

phase mask; Diffuser;

optical filter;

amplitude, phase, or colour filter

particular location (e.g. in Fourier, holobject or image plane)

SLM as specific optical component

amplitude, signed amplitude, phase, polarisation, complex, amplitude/phase coupled or colour modulation;

EASLM, OASLM, XASLM, Acousto-optic modulator;

having movable pixels

1D, 2D, 3D modulation;

multiple SLMs (e.g. for multicolour processing):

having optical element in registration;

Object types:

diffusing, translucent and phase object;

2D (e.g. 2D SLM), 3D (e.g. 2D/3D) object;

holographic object

moving, coloured object;

numerical object (e.g. computer modelled or digitized real object);

decomposed object (e.g. 2D parallax decomposition);

Laminate comprising hologram:

special arrangement of layers (e.g. printed layer);

functional layer (e.g. antireflective, colour tuning, enhancement, colour active, protective layer, polarisation, opaque or reflective layer);

Substrate aspect:

integrated surface relief hologram;

shape of the substrate (e.g. disc, ribbon, non-planar shapes)

kind of substrate (flexible, fibrous, metallic, plastic, crystalline or glass substrate);

Patterned hologram;



## Definition statement

Light characteristics;

- Surface relief holograms;
- Copying holograms without interference recording, including embossing, moulding, casting, electroplating, masking.

## References

### Informative references

Attention is drawn to the following places, which may be of interest for search:

Material deformation using laser beam	<a href="#">B23K 26/00</a>
Moulds with particular shape of the moulding surface	<a href="#">B29C 33/42</a>
Moulding article	<a href="#">B29C 37/0053</a>
Injection moulding	<a href="#">B29C 45/00</a>
Layered product	<a href="#">B32B 27/00</a> , <a href="#">B32B 33/00</a> , <a href="#">B32B 37/00</a>
Embossing decorations or marks	<a href="#">B44B 5/00</a>
Pressing or stamping ornamental designs on surfaces	<a href="#">B44C 1/24</a>
Manufacturing diffraction gratings using mechanical means	<a href="#">G02B 5/1852</a>
SLM having movable pixels	<a href="#">G02B 26/0808</a> , <a href="#">G02B 26/0825</a> , <a href="#">G02B 26/0833</a>
Photorefractive material per se	<a href="#">G02F 1/0338</a> , <a href="#">G02F 1/0541</a>
Electro-optic SLM	<a href="#">G02F 1/05</a> , <a href="#">G02F 1/13</a>
Optically addressed SLM	<a href="#">G02F 1/133362</a>
Holographic polymer dispersed liquid crystals	<a href="#">G02F 1/13342</a>
Photographic contact printing apparatus	<a href="#">G03B 27/02</a>
Photosensitive recording materials per se	<a href="#">G03C 1/00</a> , <a href="#">G03C 5/00</a> , <a href="#">G03C 7/00</a> , <a href="#">G03C 8/00</a>
Package for films	<a href="#">G03C 3/00</a>
Dichromated gelatine for photolithography	<a href="#">G03C 5/22</a> , <a href="#">G03F 7/04</a>
Bleaching	<a href="#">G03C 5/44</a>
Preparation of phase shift mask	<a href="#">G03F 1/26</a>
Photoresist material for photolithography	<a href="#">G03F 7/00</a>
Photopolymer material for photolithography	<a href="#">G03F 7/001</a>
Recording members for recording by exposure	<a href="#">G03G 5/00</a>
SLM for holographic storage	<a href="#">G11B 7/128</a>
Inorganic recording material per se	<a href="#">G11B 7/243</a>
Photopolymer material for holographic storage	<a href="#">G11B 7/245</a>
Producing master for CD/DVD	<a href="#">G11B 7/261</a>
Magneto-optical recording material per se	<a href="#">G11C 13/043</a>
Photorefractive, electro-optical recording material per se	<a href="#">G11C 13/044</a>
Photochromic recording material per se	<a href="#">G11C 13/045</a>

Other recording material per se	<a href="#">G11C 13/046</a>
Lasers	<a href="#">H01S 3/00</a>

## Glossary of terms

*In this place, the following terms or expressions are used with the meaning indicated:*

2D/3D object	Object formed of a stack of parallel 2D cross-sections of the object with a set of parallel 2D planes
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## Synonyms and Keywords

*In patent documents, the following abbreviations are often used:*

EASLM	Electrically addressed SLM
LCD	Liquid Crystal Display
OASLM	Optically addressed SLM
SLM	Spatial Light Modulator

## G03H 2001/0204

{Object characteristics}

### References

#### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Object characteristics for holographic processes or apparatus	<a href="#">G03H 2210/00</a>
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## G03H 2001/022

{Writing means other than actinic light wave}

### References

#### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Writing means other than actinic light wave	<a href="#">G03H 2224/00</a>
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## G03H 2001/0224

{Active addressable light modulator, i.e. Spatial Light Modulator [SLM]}

### References

#### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Active addressable light modulator	<a href="#">G03H 2225/00</a>
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**G03H 2001/0232****{Mechanical components or mechanical aspects not otherwise provided for}****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Mechanical components or mechanical aspects	<a href="#">G03H 2227/00</a>
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**G03H 1/04****Processes or apparatus for producing holograms ([G03H 1/26](#) takes precedence)****Definition statement***This place covers:*

- Optical recording geometry : in-line, off-axis, non-orthogonal; transmission or reflection; image plane, Fourier transform, Lippmann;
- Recording arrangement involving particular optical element (e.g. a diffuser for recording coded-beam hologram); particular beam shape or geometry;
- Recording arrangement adapted to compensate or suppress aberration, distortions or unwanted interference fringes ;
- Recording arrangement adapted to record HOE;
- Coded beam holography (wherein at least one of the object and reference beams is optically coded (e.g. with a diffuser) during recording);
- Coherence gated holography;
- Polarisation preserving holography;
- Pseudo-deep holography;
- Total internal reflection, waveguide, substrate-mode holography;
- Harmonic holography;
- Monitoring the hologram formation;

Particular processing of hologram record carrier, including

- pre-exposure processing e.g. hypersensitization, partial deactivation, trimming;
- Post-exposure processing including
- chemical processing e.g. latensification, bleaching, fixing, trimming;
- physical processing e.g. shaping, delaminating, de-metalization;
- fringe deformation (swelling or shrinking processes) e.g. for tuning reconstruction wavelength or measuring substrate deformation;
- erasing the holographic information, including coherent erasure by superimposing pi shifted information;

Copying holograms by holographic means including :

- Contact copy
- Copying wherein the H1 and H2 holograms are separated such that the reference beam exposing the H2 does not interact with the H1;
- Copying using conjugate waves;
- Copying with category transfer;
- Subdivided copy.

## References

### Limiting references

*This place does not cover:*

Processes or apparatus specially adapted to produce multiple holograms	<a href="#">G03H 1/26</a>
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## Glossary of terms

*In this place, the following terms or expressions are used with the meaning indicated:*

H1/H2 process	Transferring holographic information from master H1 to recording material H2
TIR	Total Internal Reflection

## G03H 2001/0436

{Holographic camera}

## References

### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Handheld portable device, e.g. holographic camera, mobile holographic display	<a href="#">G03H 2227/02</a>
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## G03H 2001/0439

{for recording Holographic Optical Element [HOE]}

## References

### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Holograms used as optical elements	<a href="#">G02B 5/32</a>
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## G03H 2001/0452

{arranged to record an image of the object}

## References

### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Adaptation of holography in microscopy, e.g. digital holographic microscope [DHM]	<a href="#">G03H 2001/005</a>
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## G03H 1/08

**Synthesising holograms, {i.e. holograms synthesized from objects or objects from holograms} (using electric digital computers [G06F](#); [G06T](#))**

### Definition statement

*This place covers:*

- Holograms synthesized from objects or objects from holograms.

In this sub-group, a digital representation of the hologram is mandatory.

- Hologram synthesis per se, comprising a numerical transform simulating light propagation (e.g. Fresnel or Fourier transforms) between object and hologram domains (for Computer Generated Hologram, CGH) or between holographic data and holobject (in digital holography).

- The main processing steps that may be involved are:

- Numerical processing of object including object description such as geometrical, parallax decomposition, slicing, rendering;
- Methods of numerical synthesis including Fresnel and Fourier transforms,
- convolution and iterative algorithm (e.g. IFTA), direct design (e.g. DBS, simulated annealing), Diffraction specific, Coherent ray tracing ;
- Numerical processing in hologram domain including noise reduction, linear
- combination of holograms, numerical padding;
- Encoding aspect including cell or point oriented coding, amplitude, phase or
- complex encoding, quantization;
- Synthesis adapted to generate holographic optical element;
- Synthesis adapted to generate holobjects from hologram, including solving phase ambiguity (phase unwrapping), recovering complex amplitude in hologram plane (using phase shifting, spatial heterodyning), synthetic aperturing;
- Adapted hardware (for computation or transmission);
- Materializing the synthetic hologram including serial or parallel printing, forming amplitude, phase or complex transmittance .

### References

#### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Digital data processing	<a href="#">G06F</a>
General purpose image data processing	<a href="#">G06T 1/00</a>
Data description and modelling of 3D objects	<a href="#">G06T 15/00</a> , <a href="#">G06T 17/00</a>

### Glossary of terms

*In this place, the following terms or expressions are used with the meaning indicated:*

Digital holography	digital recording of holograms and subsequent numerical processing
Complex hologram	CGH encoding amplitude and phase (i.e. complex values : Amplitude $\exp(i \text{ phase})$ )
Gerchberg - Saxton algorithm	a IFTA algorithm
Kinoform	CGH encoding phase only

## Synonyms and Keywords

*In patent documents, the following abbreviations are often used:*

CGH	Computer Generated Hologram
DBS	Direct Binary Search
IFTA	Iterative Fourier Transform Algorithm

## G03H 2001/187

**{Trimming process, i.e. macroscopically patterning the hologram}**

### References

#### *Informative references*

*Attention is drawn to the following places, which may be of interest for search:*

Form or shape of the hologram when not registered to the substrate	<a href="#">G03H 1/0236</a>
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## G03H 2001/188

**{Demetallisation, i.e. removing the enhancing metallic layer}**

### References

#### *Informative references*

*Attention is drawn to the following places, which may be of interest for search:*

Laminate comprising a hologram layer, conform enhancement layer	<a href="#">G03H 2250/36</a>
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## G03H 1/22

**Processes or apparatus for obtaining an optical image from holograms**  
([G03H 1/26](#) - [G03H 1/34](#) take precedence)

### Definition statement

*This place covers:*

Processes or apparatus for obtaining a holobject from an analogical or numerical hologram;

Particular reconstruction arrangement including :

- Mechanical support holding the holographic record;
- Optical arrangement and orientation between light source, hologram and detector (e.g. transmission reflection or edge lit reconstruction);
- Eliminating certain diffraction orders;
- Downstream optical component (e.g. diffusing surface revealing the holobject);
- Particular reconstruction light (white light [G03H 1/24](#));

Dynamic of the holobject

- static;
- pseudo-dynamic wherein a dynamic effect is produced from a single hologram;
- dynamic wherein a time varying sequence of holograms is displayed;

## Definition statement

- dynamic wherein a time varying sequence of holographic fringes information is addressed to a SLM;

Particular holobject including 2D, 3D, 2D+3D holobjects, rescaled or polarized holobjects;

Superposing or matching the holobject with other visual information;

Holobject having particular colour including achromatic, RGB, rainbow-like;

Particular location of the holobject with respect to the hologram, including in-plane, real, virtual or straddling holobject.

## References

### Limiting references

*This place does not cover:*

Processes or apparatus specially adapted to reconstruct holobject(s) from multiple holograms	<a href="#">G03H 1/26</a>
Systems for obtaining speckle elimination	<a href="#">G03H 1/32</a>
Systems for reducing the space-spatial bandwidth product	<a href="#">G03H 1/34</a>

### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Grating image	<a href="#">G02B 5/1842</a>
Stereoscopic microscopes	<a href="#">G02B 21/22</a>
Systems for producing stereoscopic or 3D effects	<a href="#">G02B 30/00</a>
Stereoscopic photography	<a href="#">G03B 35/00</a>
Stereo photographic or similar process	<a href="#">G03C 9/00</a>
Display per se	<a href="#">G09F 19/00</a>
Stereoscopic television system	<a href="#">H04N 13/00</a>

## Special rules of classification

Details and isolated features involved during the reconstruction process are also classified under [G03H 1/02](#).

## G03H 2001/2226

### {Edge lit holograms}

## References

### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Total internal reflection [TIR] holograms	<a href="#">G03H 1/0408</a>
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## G03H 1/26

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

### Definition statement

*This place covers:*

- Angle multiplexing (multichannel holography);
- Coherence multiplexing wherein different holobjects are perceived under incoherent and coherent illumination;
- Phase code multiplexing ;
- Polarisation multiplexing;
- Temporal multiplexing :

Frame or time sequential multiplexing wherein a plurality of sub-holograms or holographic sub-frames are time multiplexed to reconstruct one holobject;

Double or multiple exposure recording process;

- Superimposed holograms ([G03H 1/28](#)) wherein the sub-holograms are superimposed in the same recording layer;
- Spatial multiplexing ([G03H 1/30](#)) wherein the sub-holograms are spatially multiplexed in a single material layer; including:

in-plane or depth multiplexing;

shape of the sub-hologram;

interleaved sub-holograms;

tiled identical holograms;

dot matrix holograms;

- Holographic stereogram wherein a collection of parallaxic 2D pictures views of a 3D object are multiplexed into a holographic record thereby allowing to reconstruct the 3D holobject due to stereoscopic perception;

one steps and two steps holographic stereograms;

- Arrangement comprising multiple holograms in spatially separated supports

mechanically separated or in contact;

optically separated or in contact (optical contact in the sense that a reconstruction beam crosses the holograms);

made of different materials;

for spectral broadening (e.g. multicolour holobject);

comprising a HOE;

mixed volume/surface hologram;

superposed surface relief;



## References

### Limiting references

*This place does not cover:*

Double exposure interferometry	<a href="#">G01B 9/025</a>
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## Special rules of classification

Details of the recording/reconstruction arrangement are also classified in respective classes in [G03H 1/00](#).

## Glossary of terms

*In this place, the following terms or expressions are used with the meaning indicated:*

Multichannel holography	Angle multiplexed holography wherein the holobject change when orientation varies
Holographic stereogram	Hologram multiplexing a collection of parallax (2D) pictures views of a (3D) object; replays 3D holobject

## G03H 2001/2675

**{Phase code multiplexing, wherein the sub-holograms are multiplexed according to spatial modulation of the reference beam}**

## References

### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Processes or apparatus for producing holograms using spatial modulation, e.g. ghost imaging	<a href="#">G03H 1/12</a>
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## G03H 2001/2695

**{Dedicated printer}**

## References

### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Holographic printers	<a href="#">G03H 1/0476</a>
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## 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)

### References

#### Limiting references

*This place does not cover:*

Processes or apparatus for obtaining an optical image from holograms	<a href="#">G03H 1/22</a>
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#### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Analysing solids by acoustic holography	<a href="#">G01N 29/0663</a>
Seismic or acoustic prospecting or detecting	<a href="#">G01V 1/00</a>
Producing, transmitting, directing, suppressing sound waves	<a href="#">G10K</a>

## 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](#)})

### References

#### Limiting references

*This place does not cover:*

Details of holographic recording and reconstruction process	<a href="#">G03H 1/00</a>
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#### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Investigating or analysing materials by the use of microwaves	<a href="#">G01N 22/00</a>
Investigating and forming a picture of materials by the use of other wave or particle radiation e.g. X-rays or electron or neutrons	<a href="#">G01N 23/04</a>
Investigating and forming a picture of materials by the use of nuclear magnetic resonance, electron paramagnetic resonance or other spin effects	<a href="#">G01R 33/20</a>
Gamma- or X-ray microscopes	<a href="#">G21K 7/00</a>
Electron microscope	<a href="#">H01J 37/26</a>

**G03H 2210/22**

**2D SLM object wherein the object beam is formed of the light modulated by the SLM**

**References****Informative references**

*Attention is drawn to the following places, which may be of interest for search:*

Active addressable light modulator, i.e. Spatial Light Modulator [SLM]	<a href="#">G03H 2001/0224</a>
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**G03H 2210/441**

**Numerical processing applied to the object data other than numerical propagation**

**References****Informative references**

*Attention is drawn to the following places, which may be of interest for search:*

Methods of numerical synthesis of holograms, e.g. coherent ray tracing [CRT], diffraction specific	<a href="#">G03H 1/0808</a>
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**G03H 2222/55**

**Astigmatic beam having different focal planes**

**References****Informative references**

*Attention is drawn to the following places, which may be of interest for search:*

Anamorphic optical element, e.g. cylindrical	<a href="#">G03H 2223/21</a>
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**G03H 2223/21**

**Anamorphic optical element, e.g. cylindrical**

**References****Informative references**

*Attention is drawn to the following places, which may be of interest for search:*

Astigmatic beam having different focal planes	<a href="#">G03H 2222/55</a>
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**G03H 2223/50****Particular location or purpose of optical element****References****Informative references**

*Attention is drawn to the following places, which may be of interest for search:*

Reconstruction geometries or arrangements for obtaining an optical image from holograms, using downstream optical component	<a href="#">G03H 1/2205</a>
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**G03H 2224/06****Thermal or photo-thermal means****References****Informative references**

*Attention is drawn to the following places, which may be of interest for search:*

Light sources or light beam spectral composition being infrared [IR]	<a href="#">G03H 2222/16</a>
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**G03H 2250/10****arranged to be transferred onto a carrier body****References****Informative references**

*Attention is drawn to the following places, which may be of interest for search:*

Laminate comprising a hologram adhesive layer	<a href="#">G03H 2250/35</a>
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**G03H 2260/50****Reactivity or recording processes****References****Informative references**

*Attention is drawn to the following places, which may be of interest for search:*

Light sources or light beam properties	<a href="#">G03H 2001/0212</a>
Writing means other than actinic light wave	<a href="#">G03H 2001/022</a>

**G03H 2260/63****Indirect etching, e.g. lithography****References*****Informative references****Attention is drawn to the following places, which may be of interest for search:*

Photoresist	<a href="#">G03H 2260/14</a>
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