

The Digital Holography Era

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www.holoprint.com

- ❑ Introduction of concept of recording MPGH
- ❑ Mathematical description
- ❑ Digital interface of the DFCH
- ❑ New possibilities using DFCH
- ❑ Future outlook: The Office Holoprinter (video)

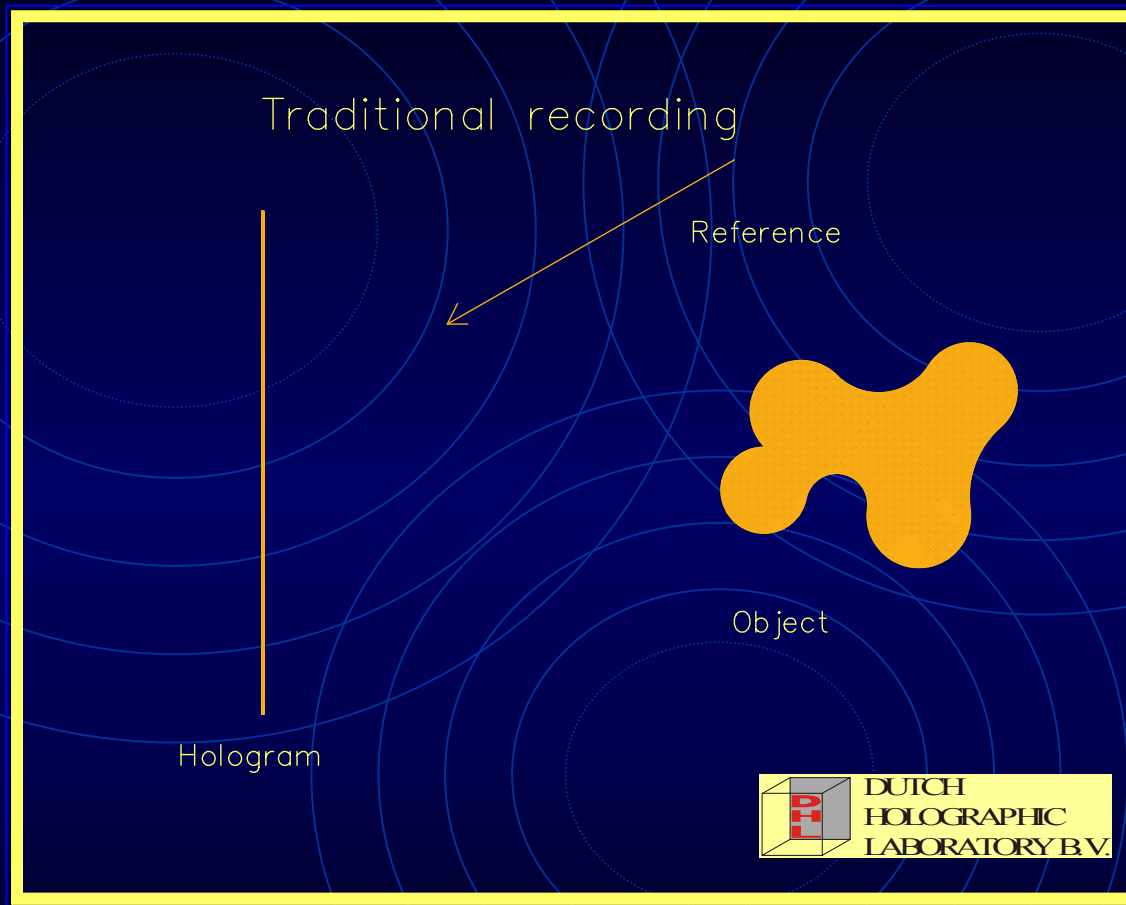
Abstract

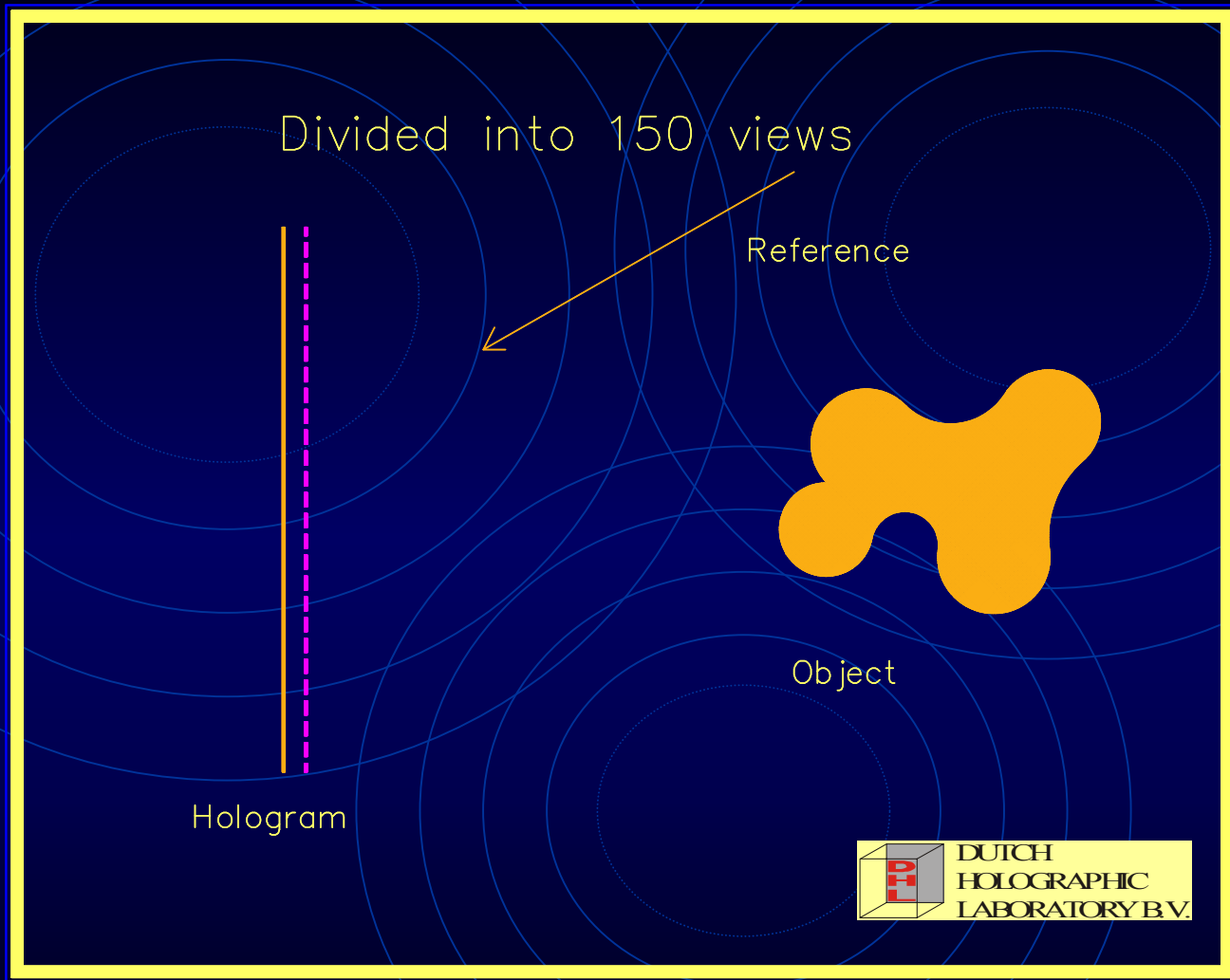
The digital holography era is here now. We describe how we got to this point. Starting chronological with stereograms from slides or film through the Multiple Photo Generated Holography (MPGH) technique to the current Digital state of the art. We will present what we believe is the future for display holography.

Introduction

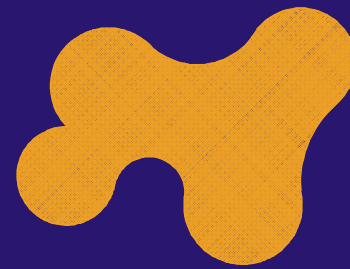
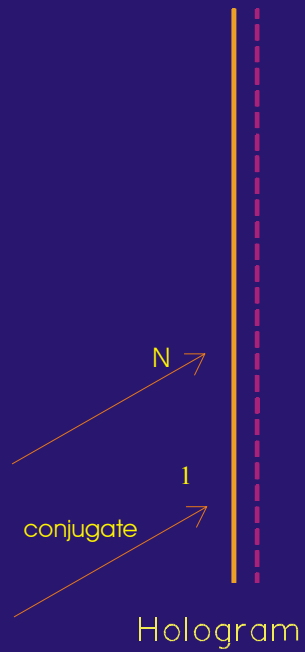
- 1986 first computer generated hologram using line plots on paper, registered onto glass plates
- 1990 Paper on MPGH technique at SPIE meeting in The Hague.
- 1992 presented the first digital recorded hologram using an LCD screen at SPIE meeting San Jose.

- 1993 One step Holoprinter
- 1996 Improved One step quality printing, 6x8cm
- 1996 Digital full Color Holoprinter kit (DFCH)
- 1997 DMD interface





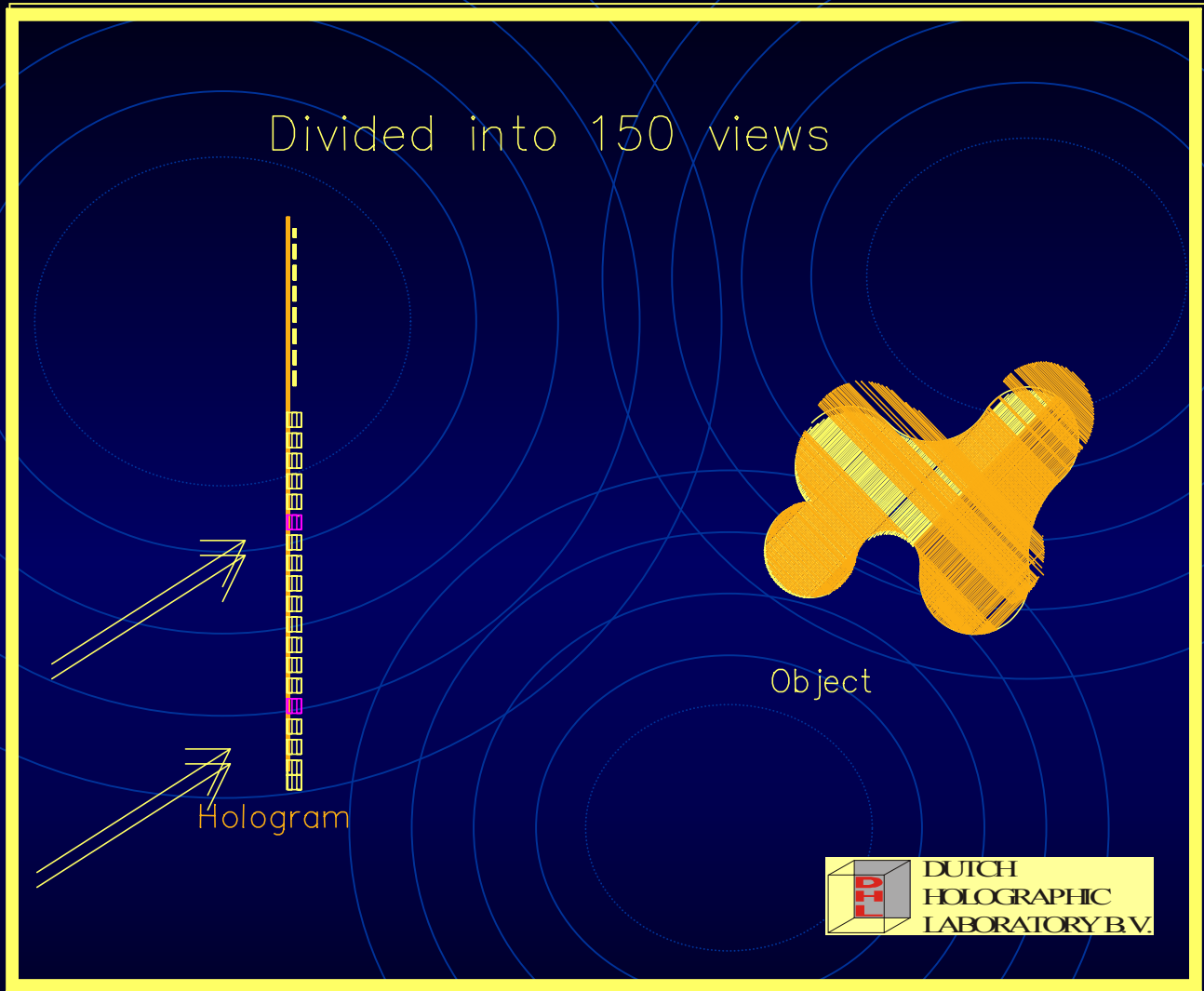
Divided into 150 views



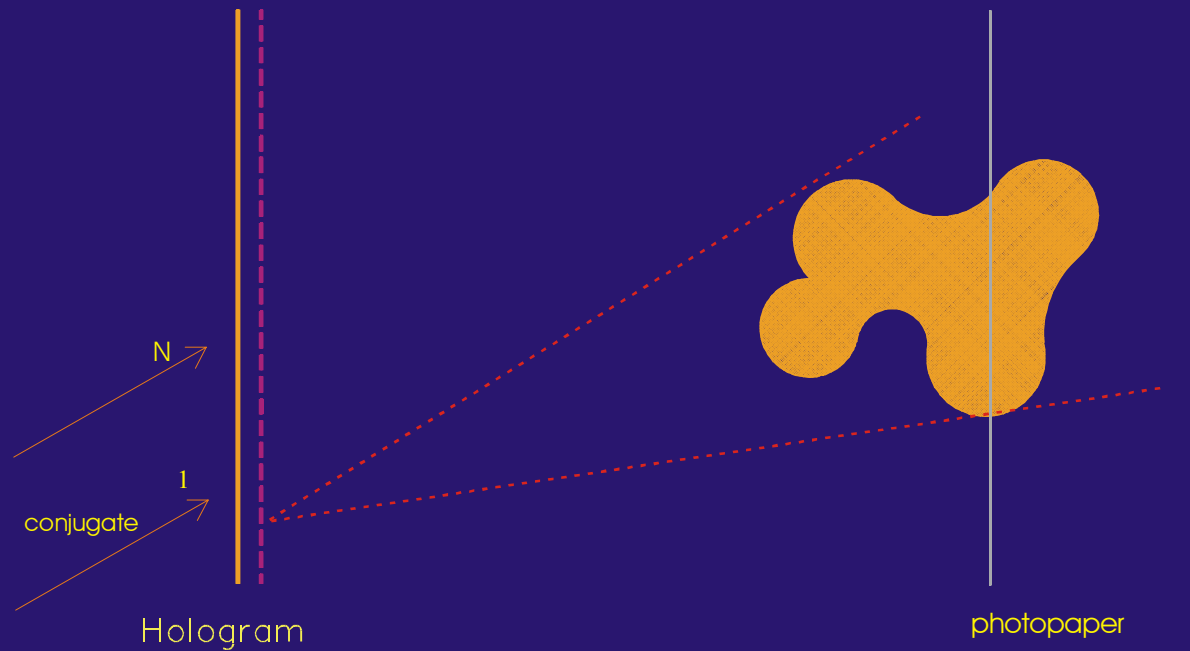
Object



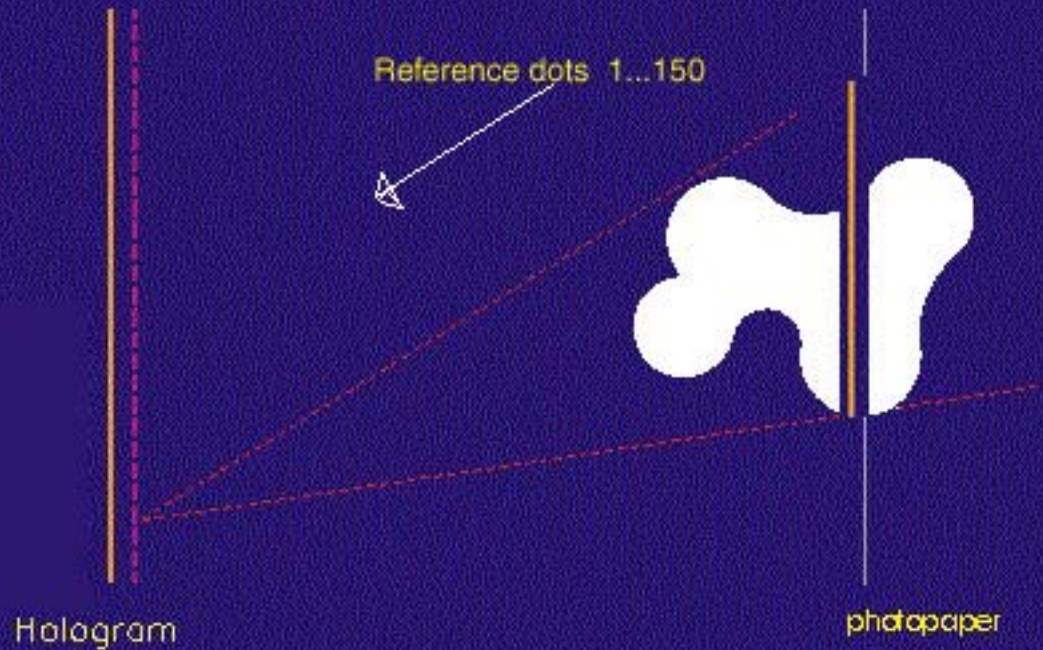
Divided into 150 views

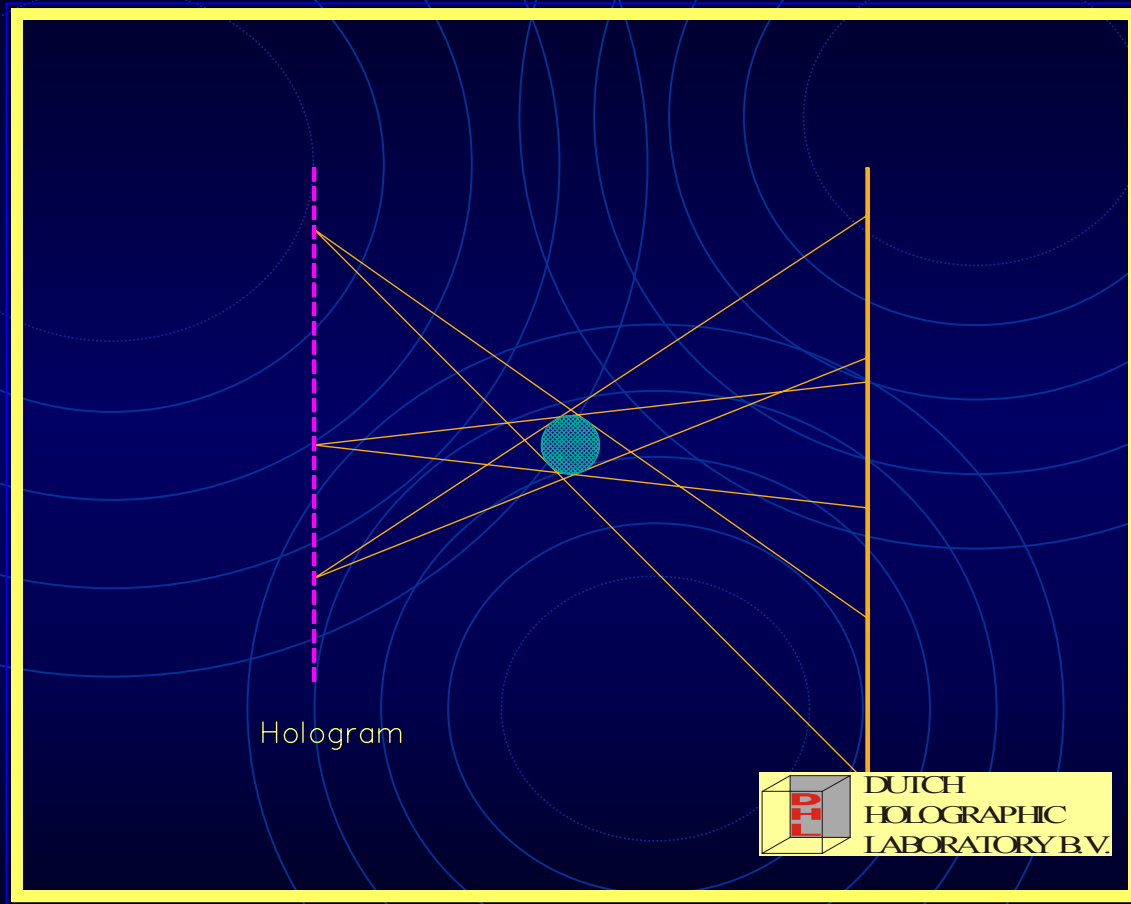


Divided into 150 views

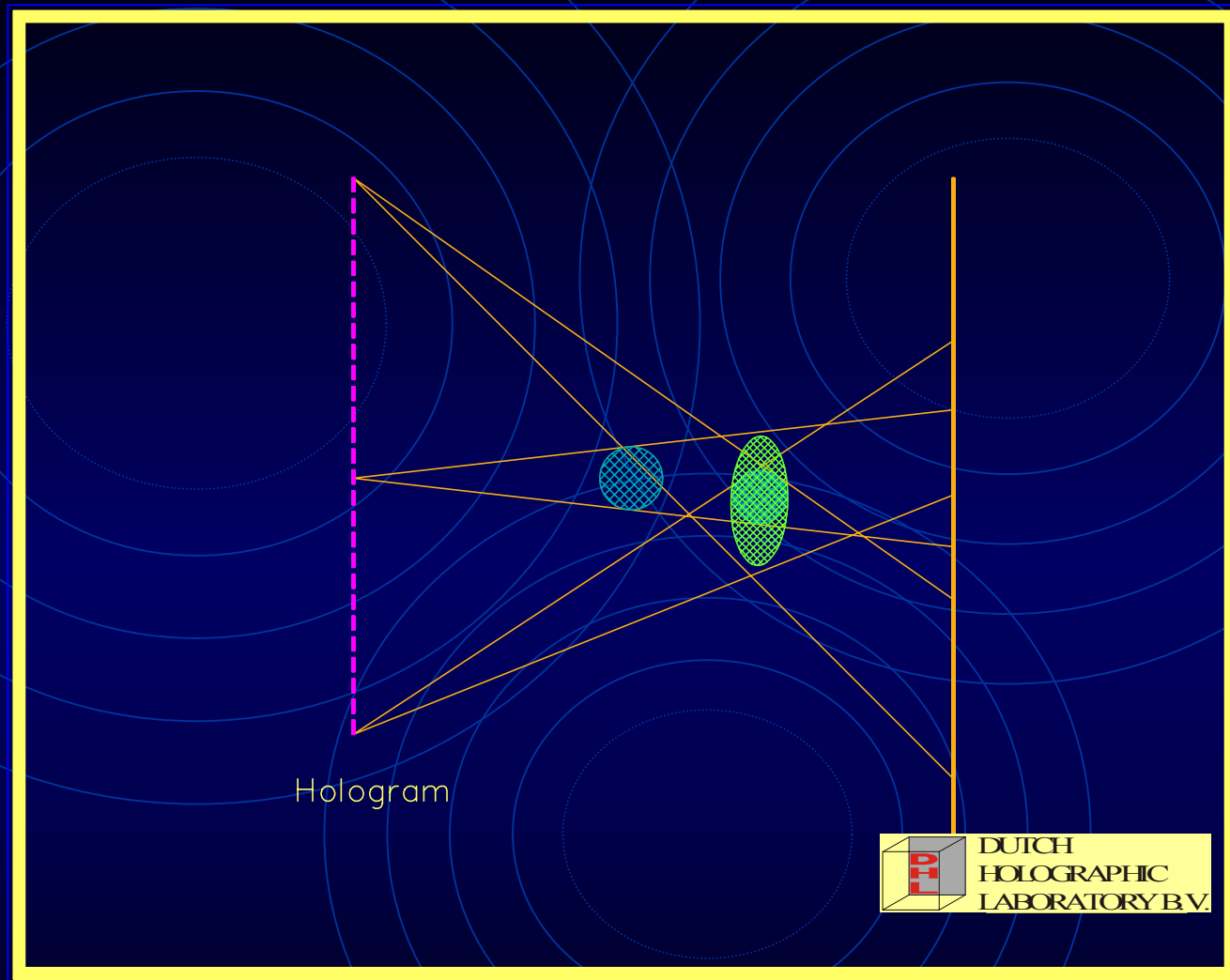


Record 150 dot holograms from 150 photopaper images





Projection when slits are not joint together the right way .



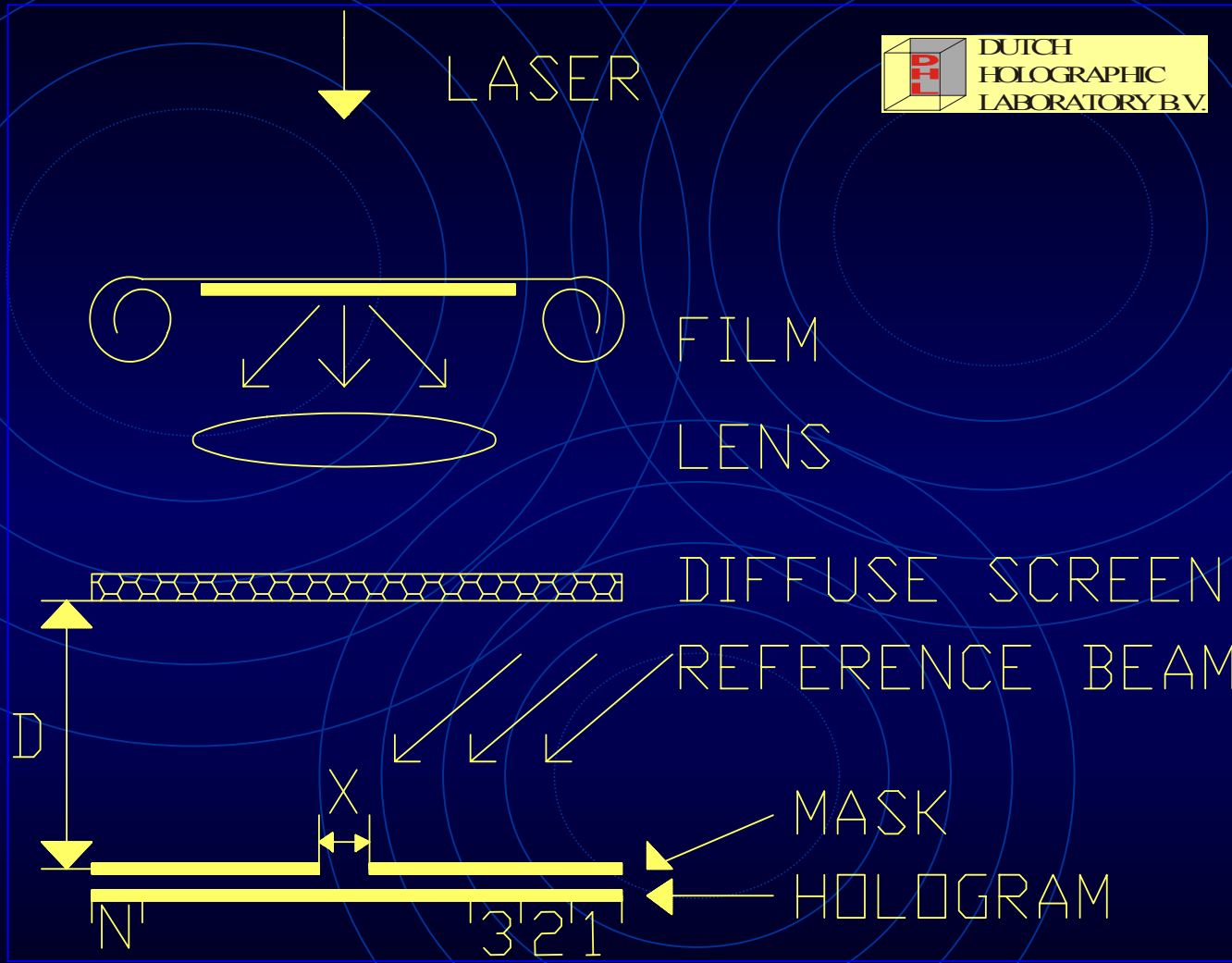
Conclusion

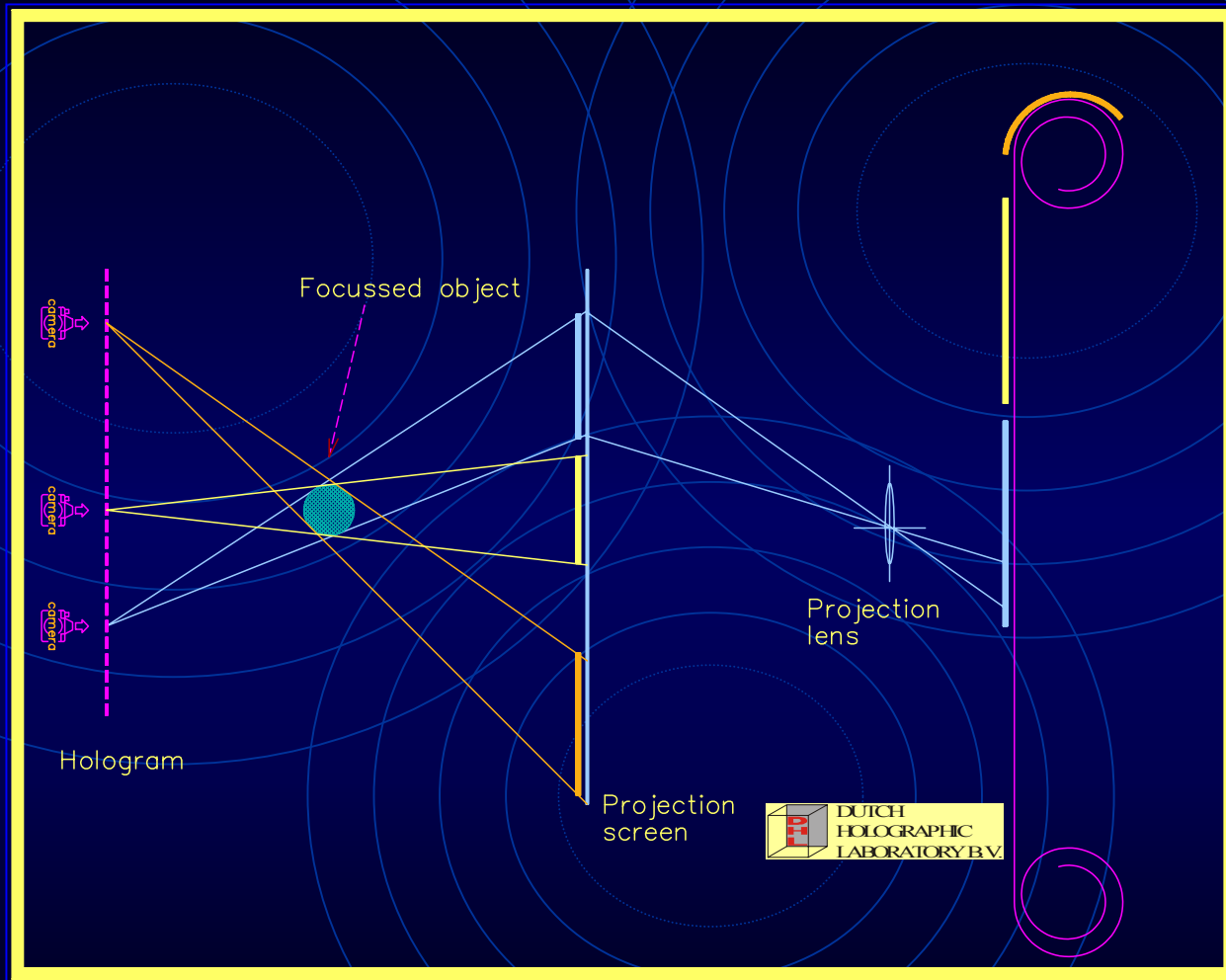
We have made a hologram of a physical object using flat images.

If we could generate these flat images from 3D computer models we could actually make holograms of physical models which don't exist yet.

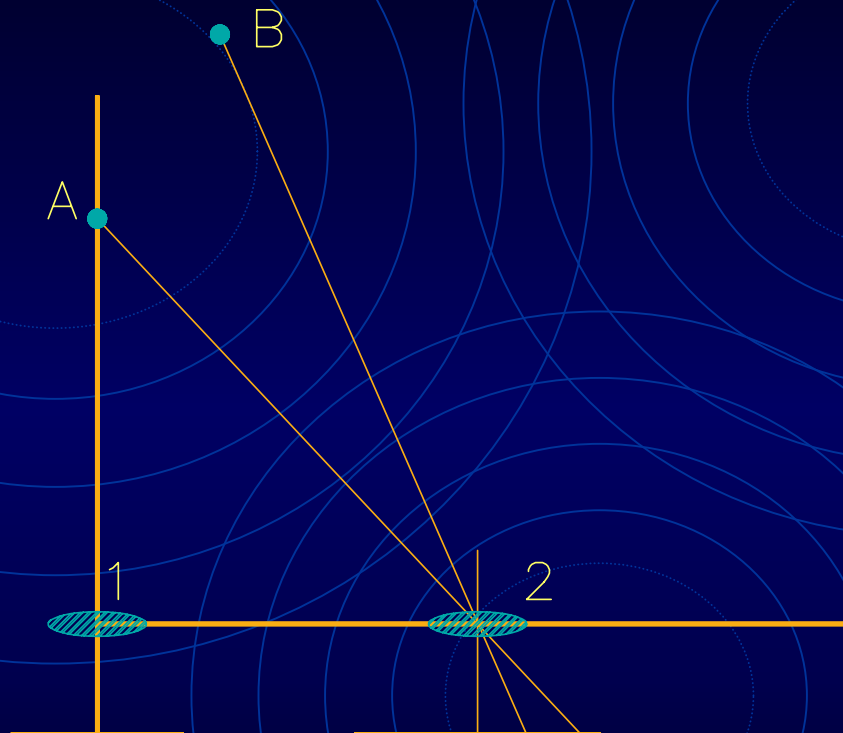
We have dubbed this process :

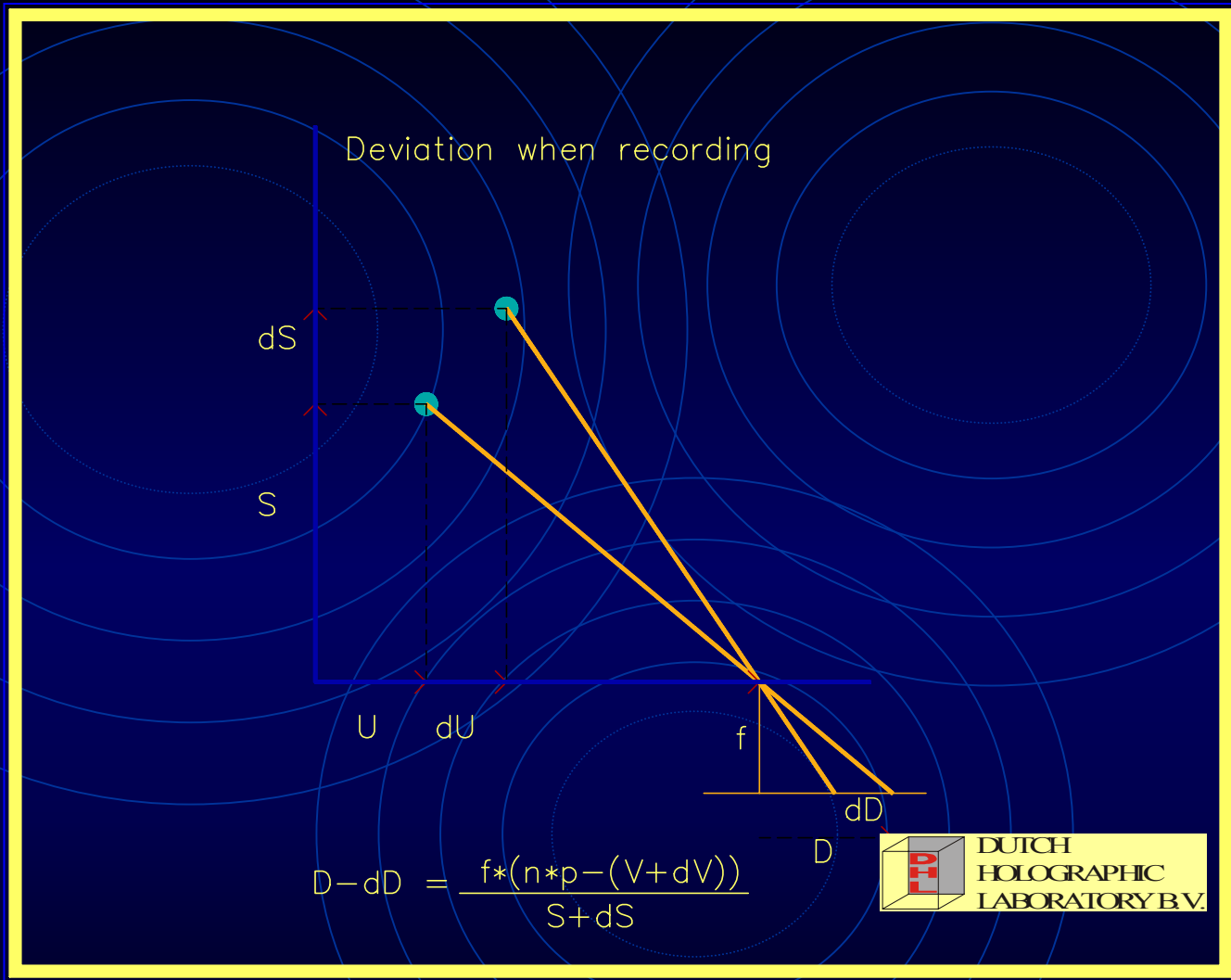
Rapid Virtual Prototyping

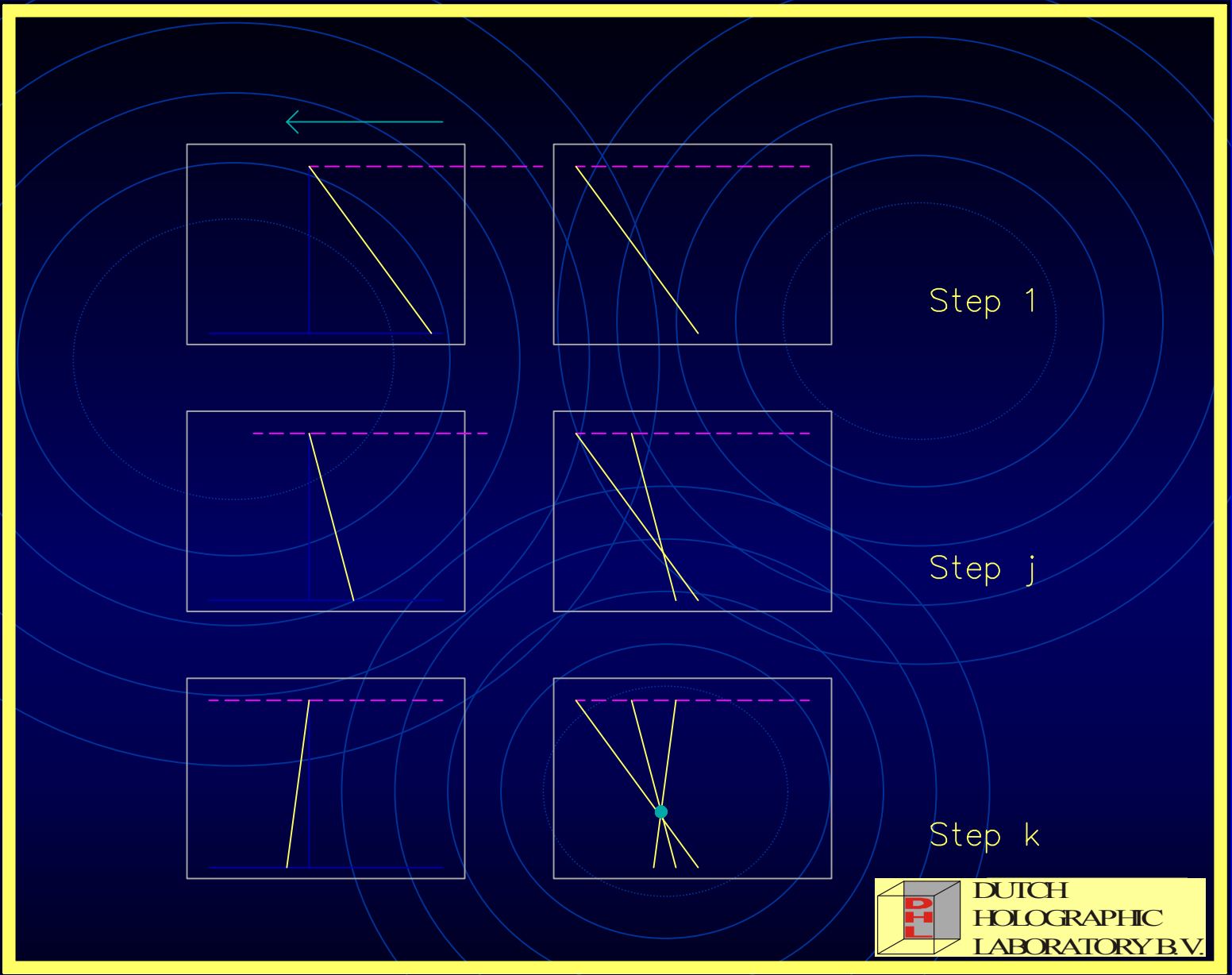




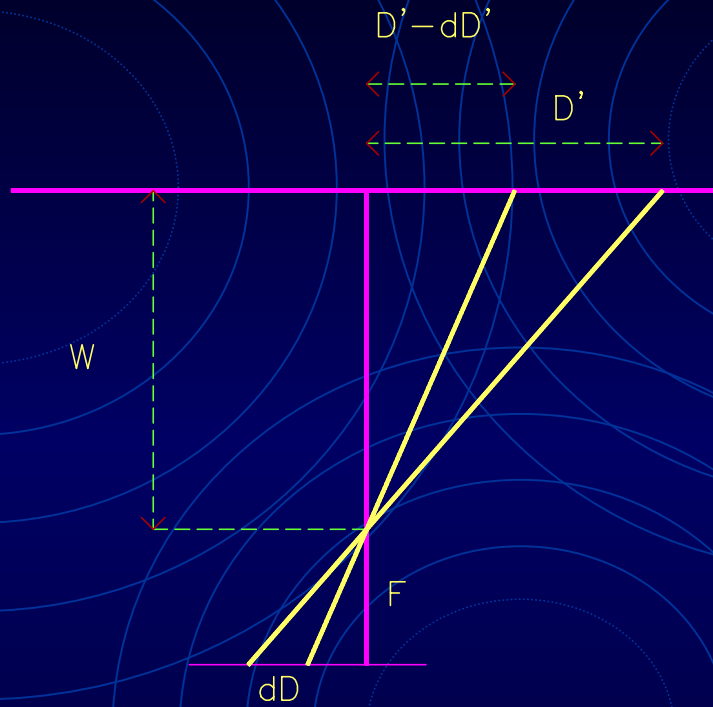
Depth transferred to deviation







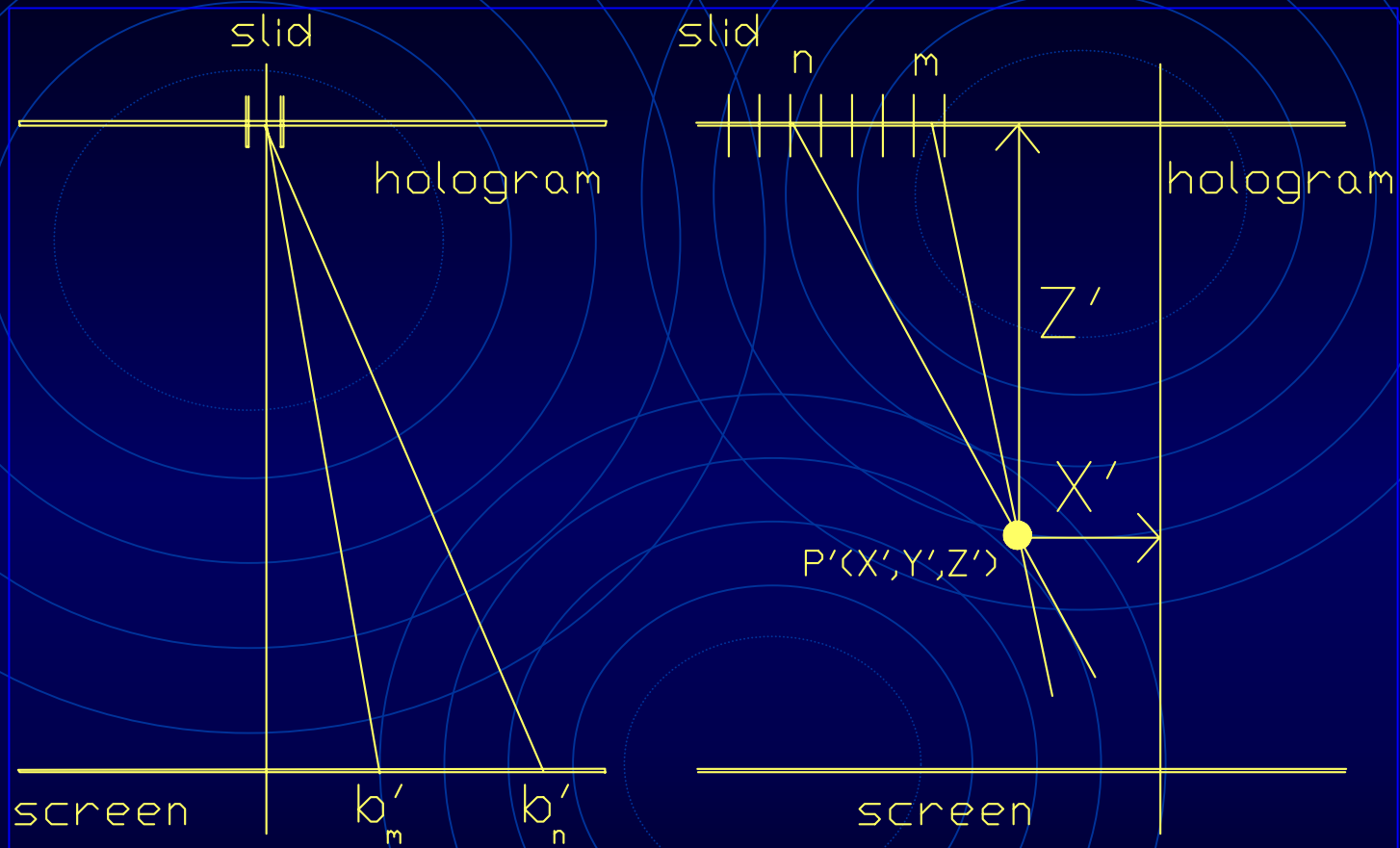
Deviation when projected



$$D' - dD' = \frac{W}{F} * (D - dD)$$



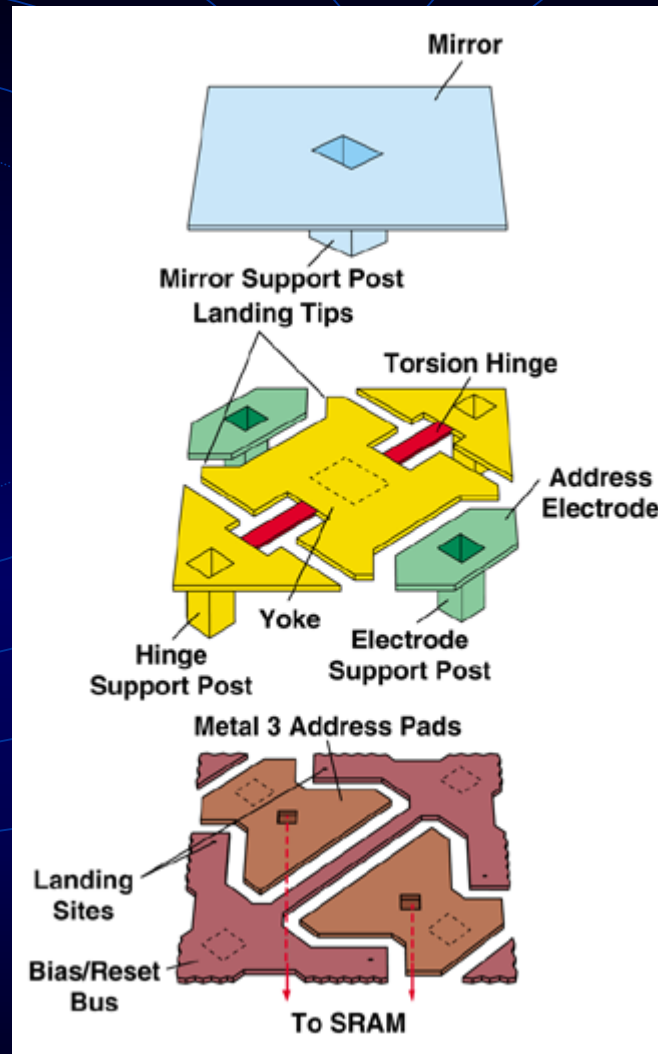
Congruent triangles at the recording and projection step.



Digital Interface

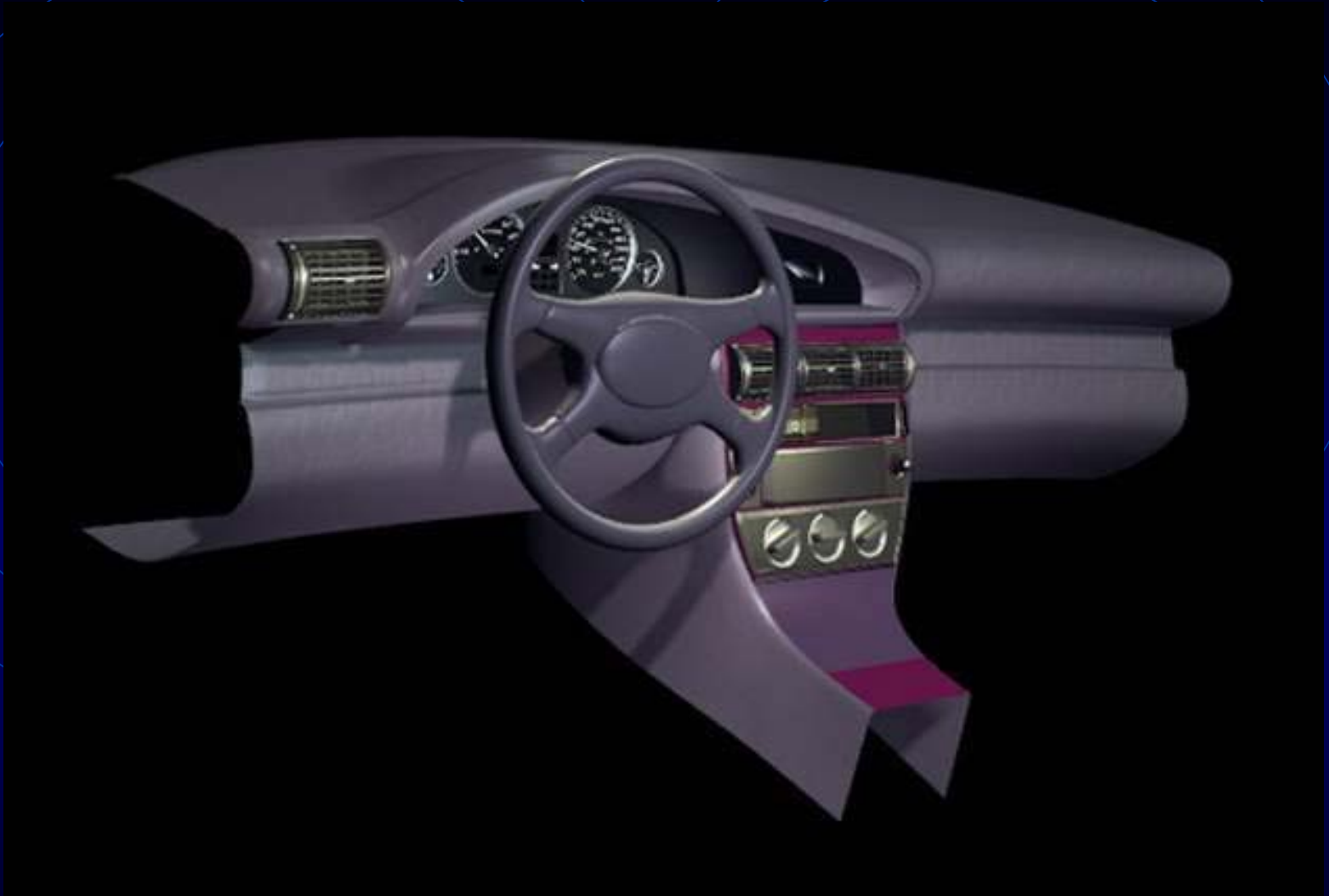
- LCD screen
- DMD projector
- Reflective LCD chip
- Low transmission
- Polarization
- Contrast ratio 160:1
- High light efficiency (3 times)
- High contrast ratio 500:1
- Digital DMD addressing needs attention
- Availability
- Polarization

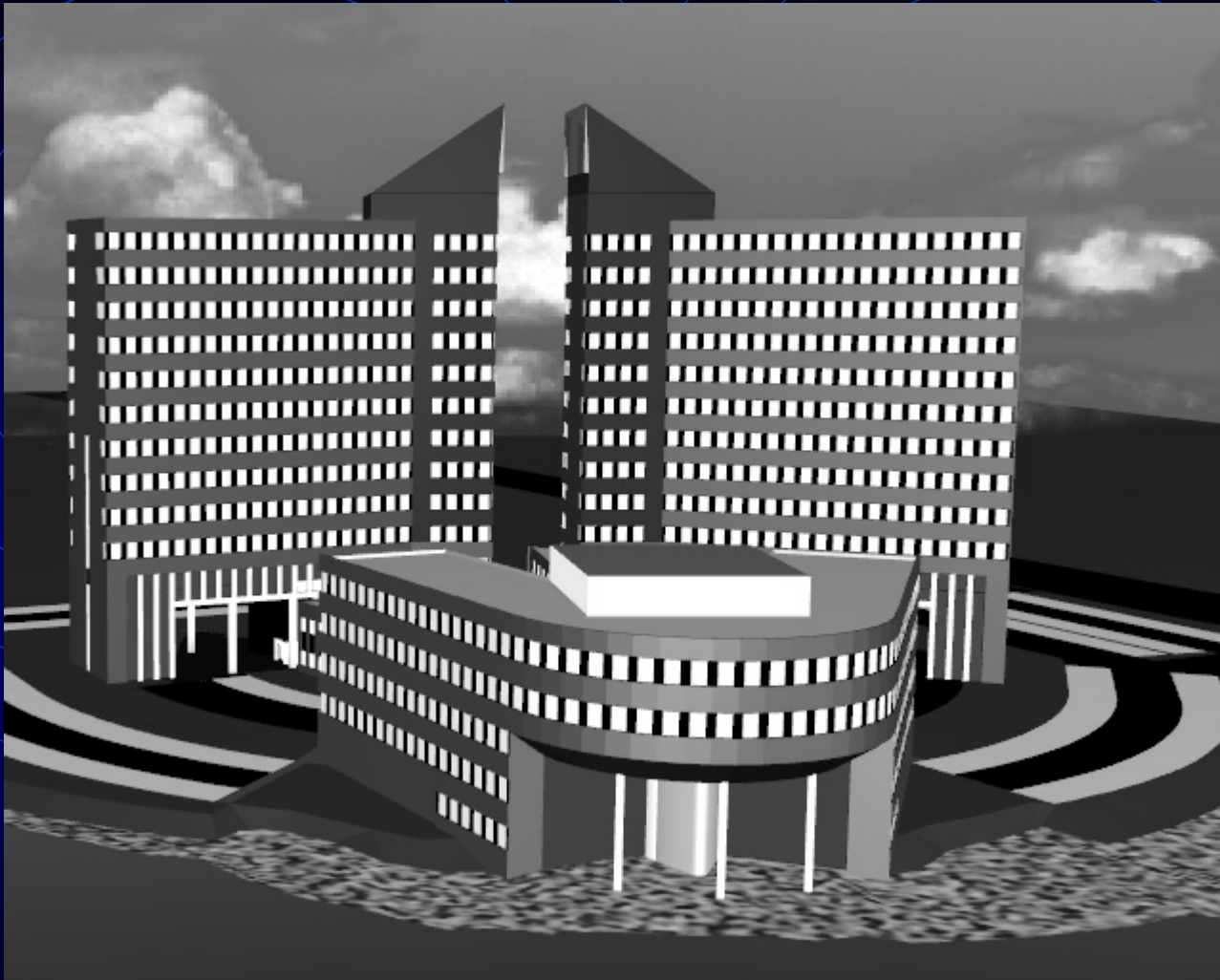
DMD one mirror



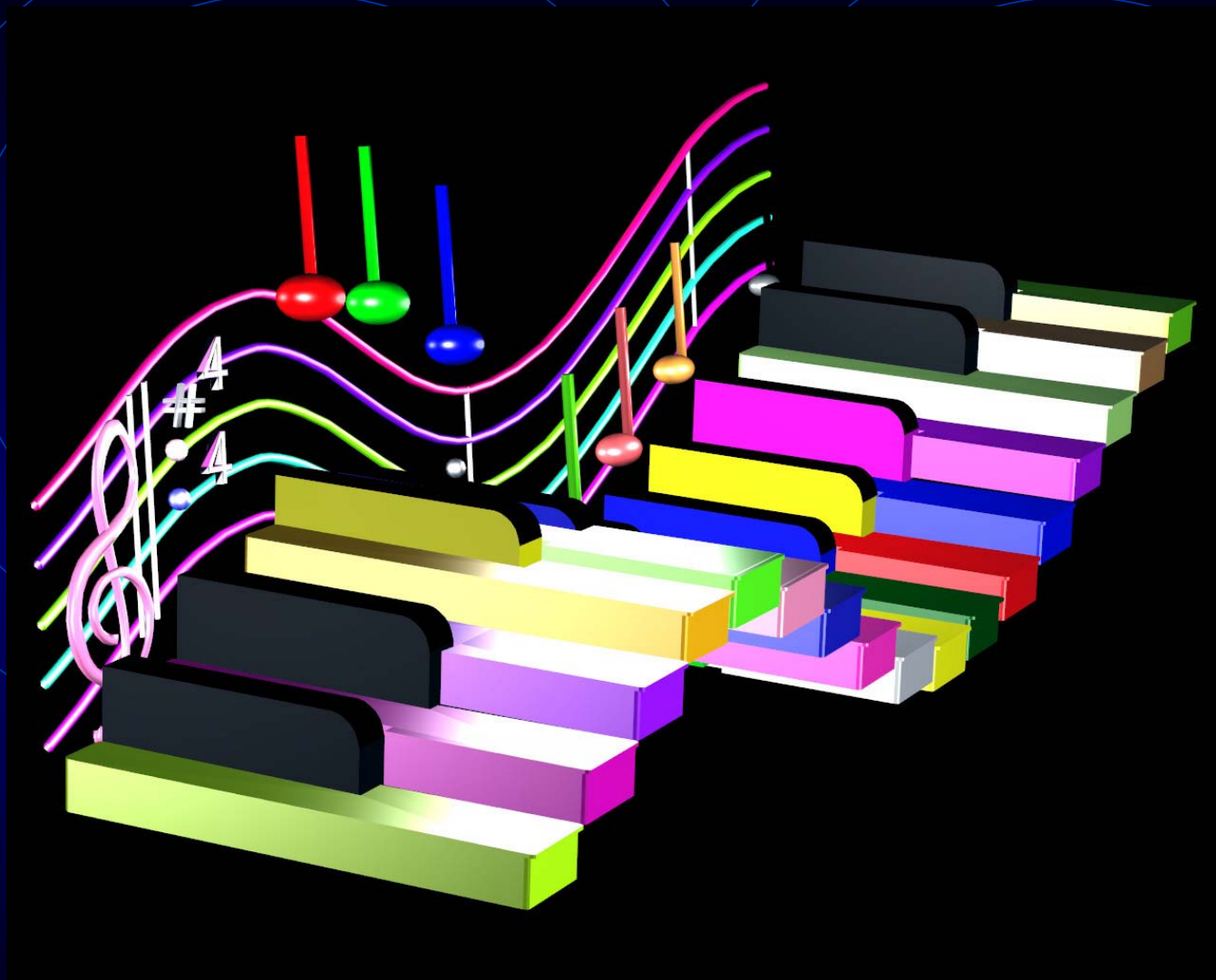
DIGITAL FULL COLOR HOLOPRINTING

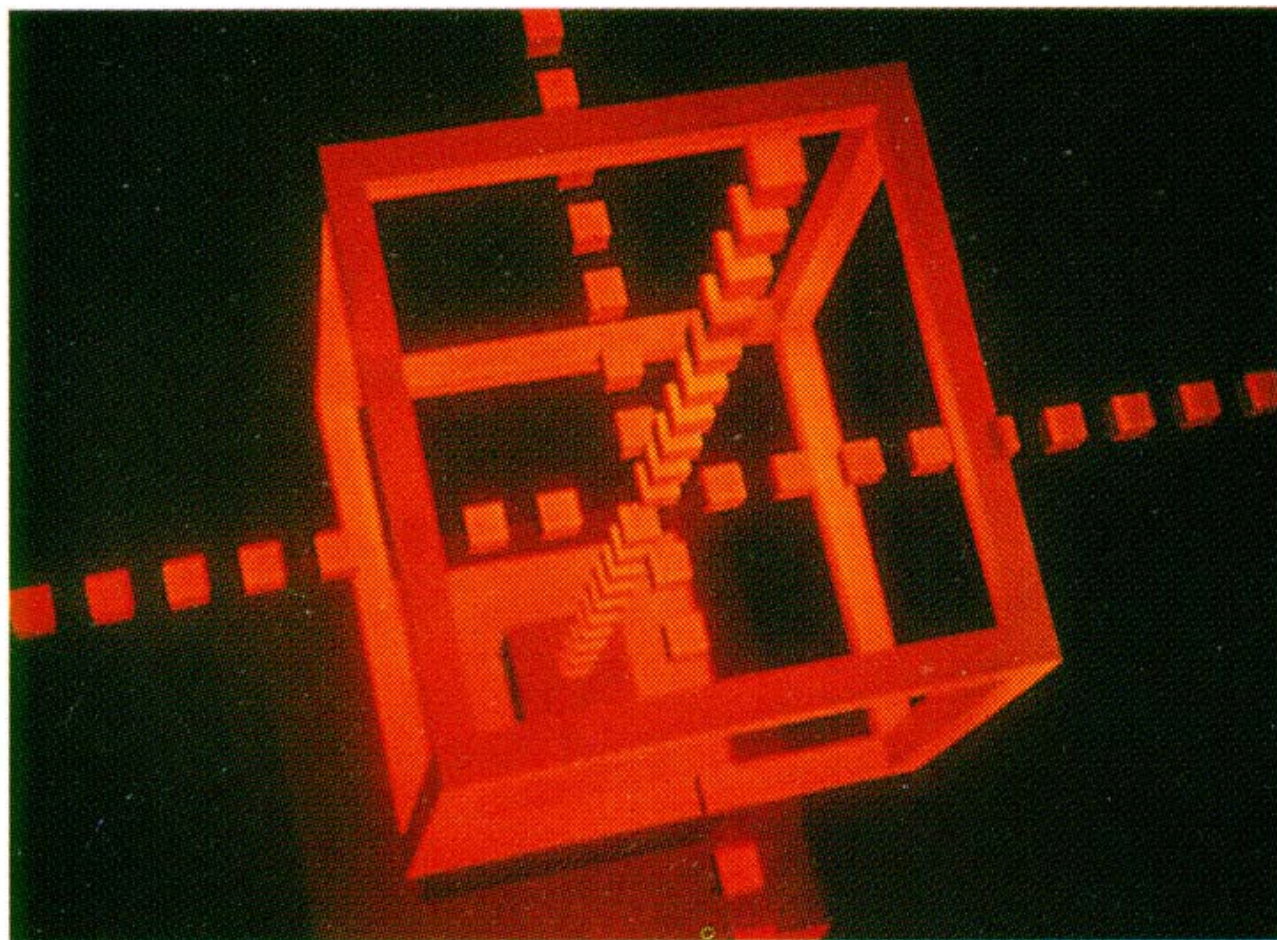








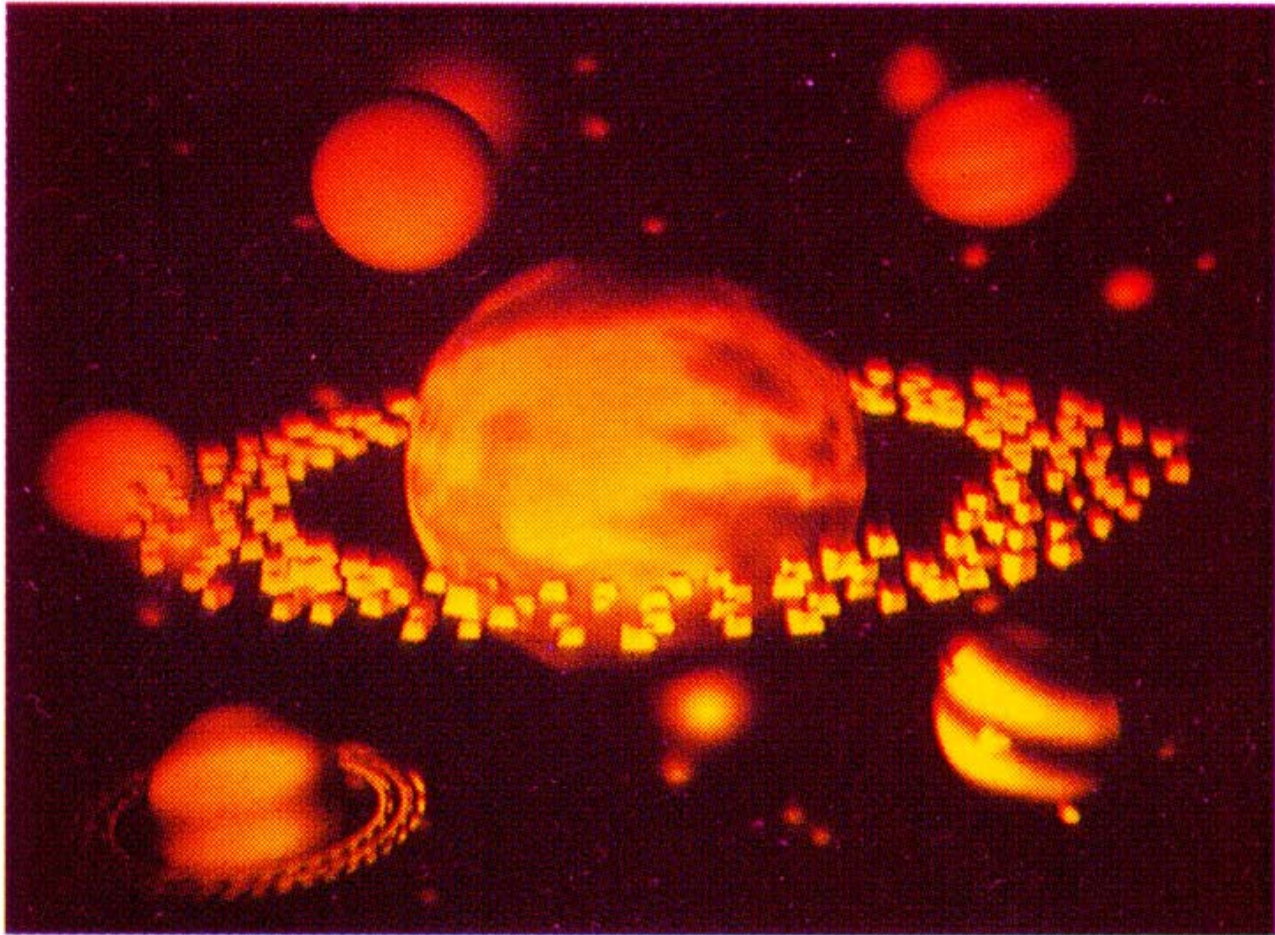




KUPU

30 x 40 cm

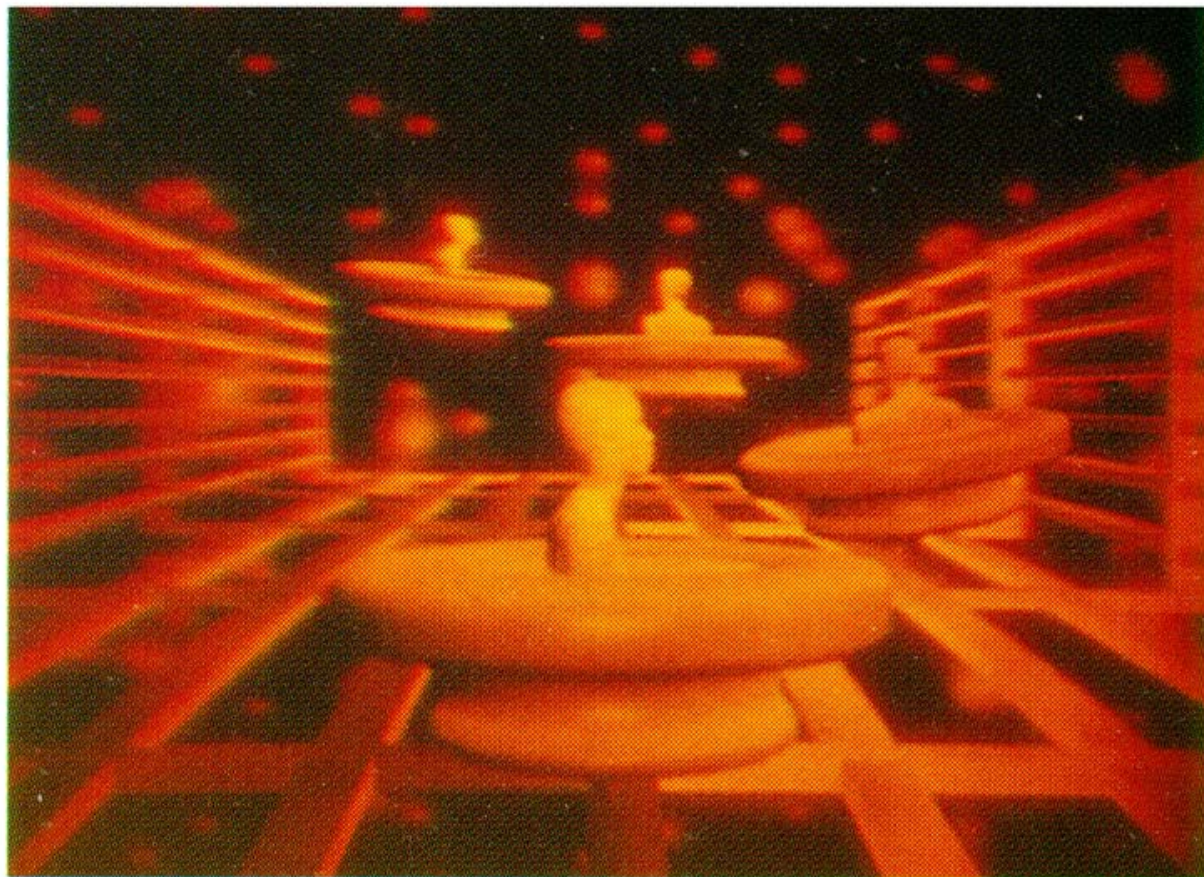
Limited edition 250 pcs.



PLANETS

30 x 40 cm

Limited edition 250 pcs.

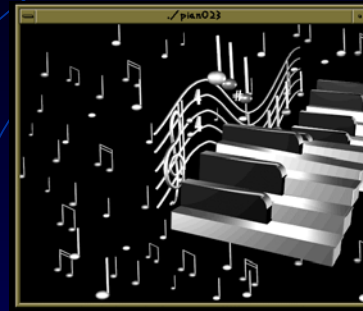
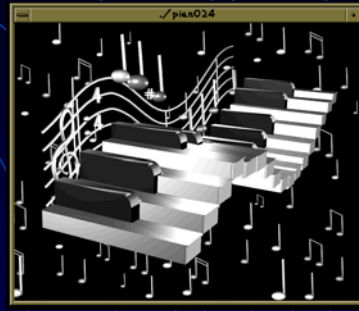
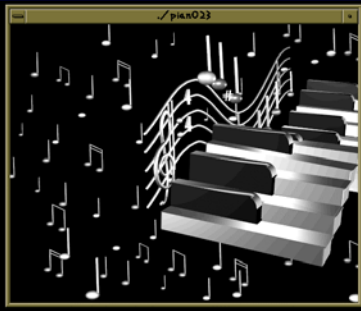


FLASH TUNNEL

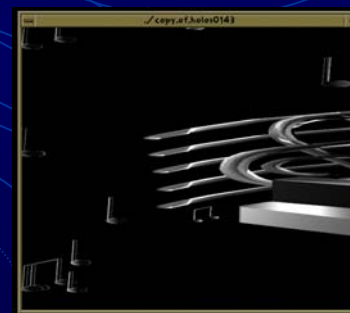
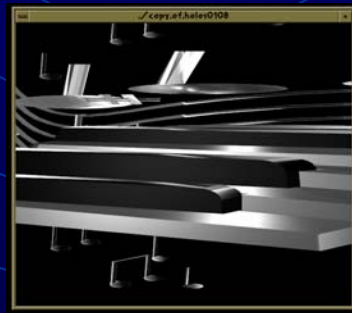
30 x 40 cm

Limited edition 250 pcs.

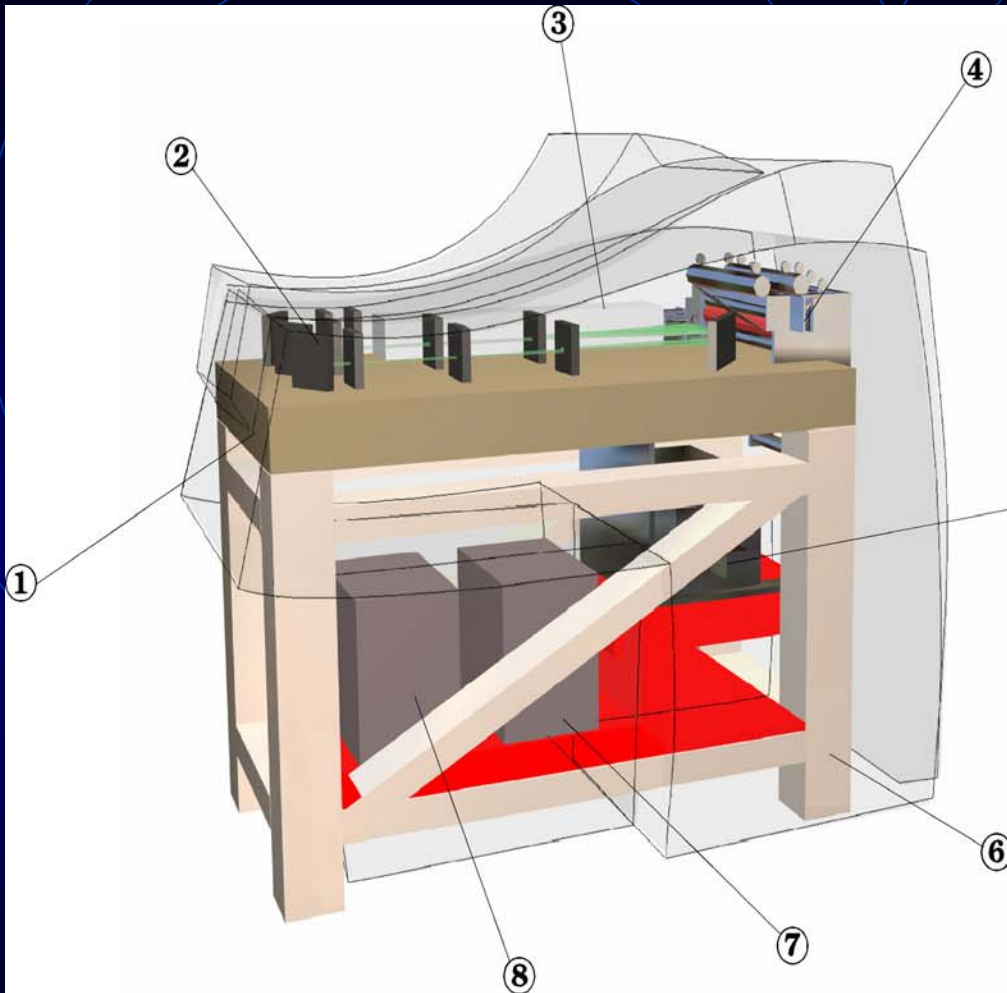
One step Holoprinter



The resulting images from camera position, recorded in H1 slits.



Resulting images from camera position, recorded in the H2 slits



SCHEMATISCHE OPBOUW VAN DE DESKSIDE HOLOPRINTER

- ① TRILLINGSVRIJE OPTISCHE TAFEL
- ② OPTISCHE COMPONENTEN EN HOOG RESOLUTIE LCD SCHERM
- ③ HOOG VERMOGEN SOLID STATE LASER
- ④ FILMTRANSPORT
- ⑤ FILMROLHOUDER
- ⑥ AKTIEF DEMPEND FRAME
- ⑦ CONTROLLER
- ⑧ SILICON GRAPHICS COMPUTER

New possibilities with Digital Recording

- Animations
- Images float easier
- Impossible lighting
- Freedom of design
- Any 3D data set can be visualized
- Holographic production reliable

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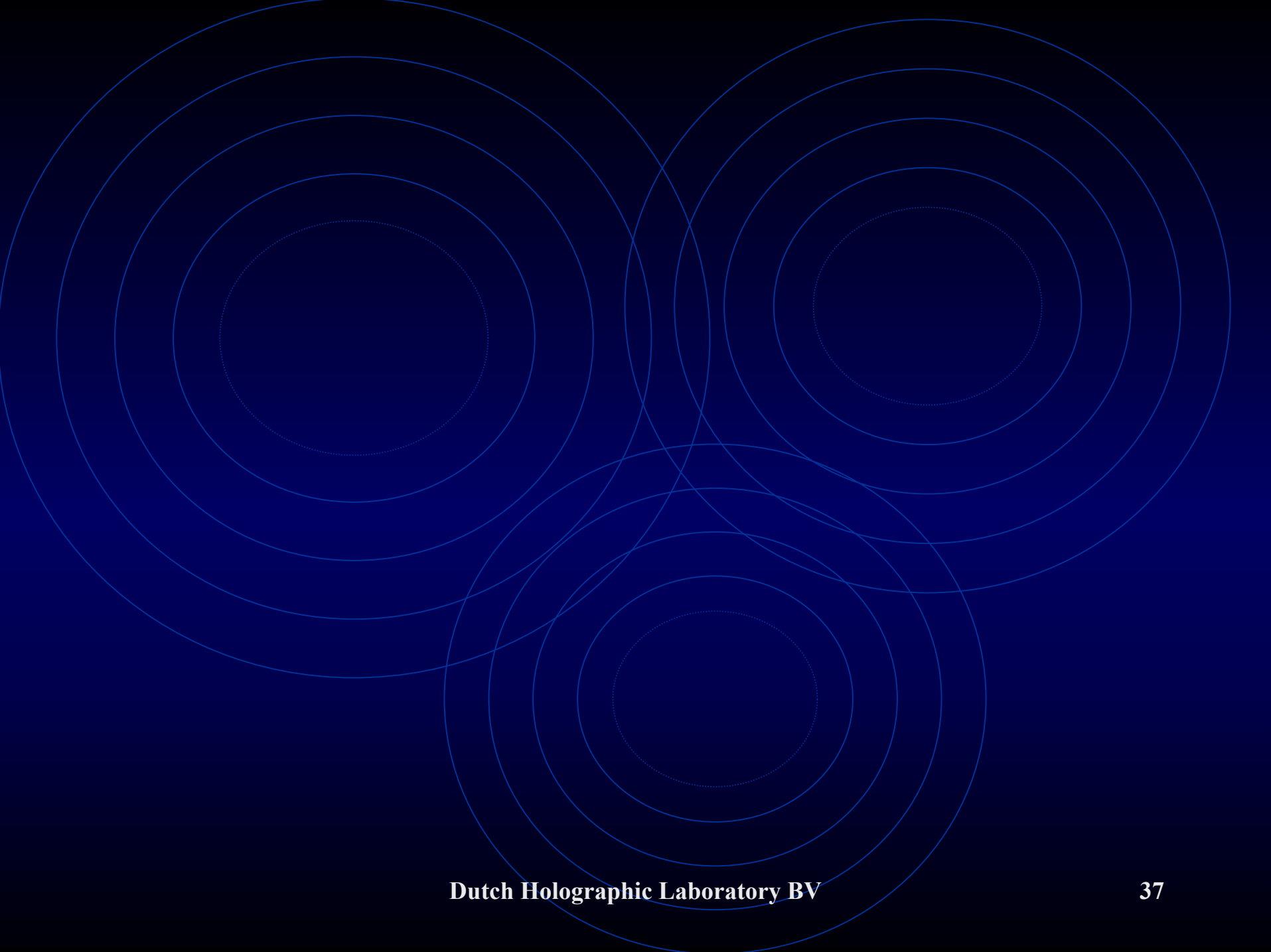
[Takahashi]

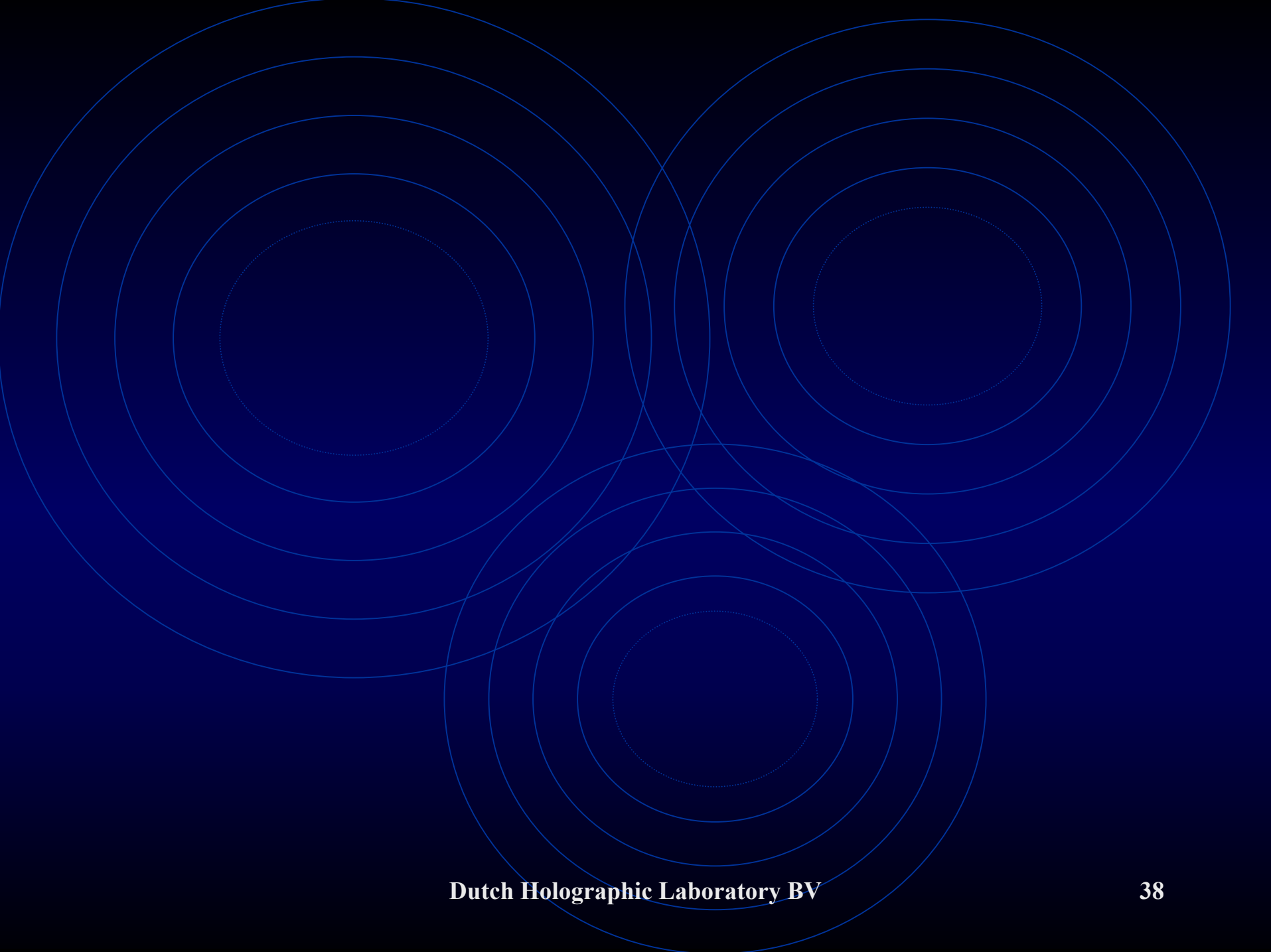
Generation of Intermediate Parallax-images for Holographic Stereograms. S.Takahashi, T.Honda, M.Yamaguchi, N.Ohyama, F.Iwata. Technical Research Institute Toppan Printing Co.Ltd. Proc. SPIE San Jose 1914, 1993

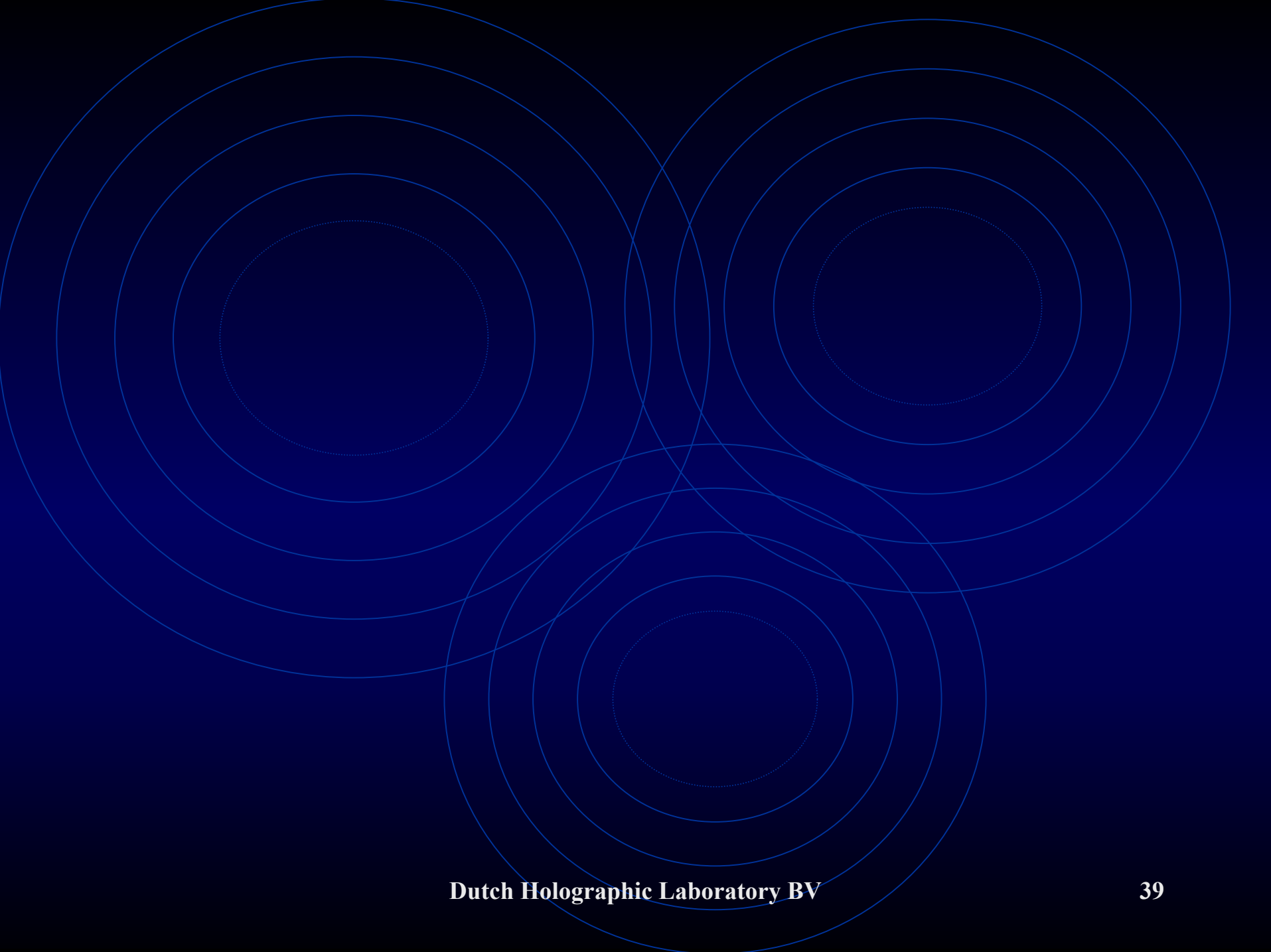


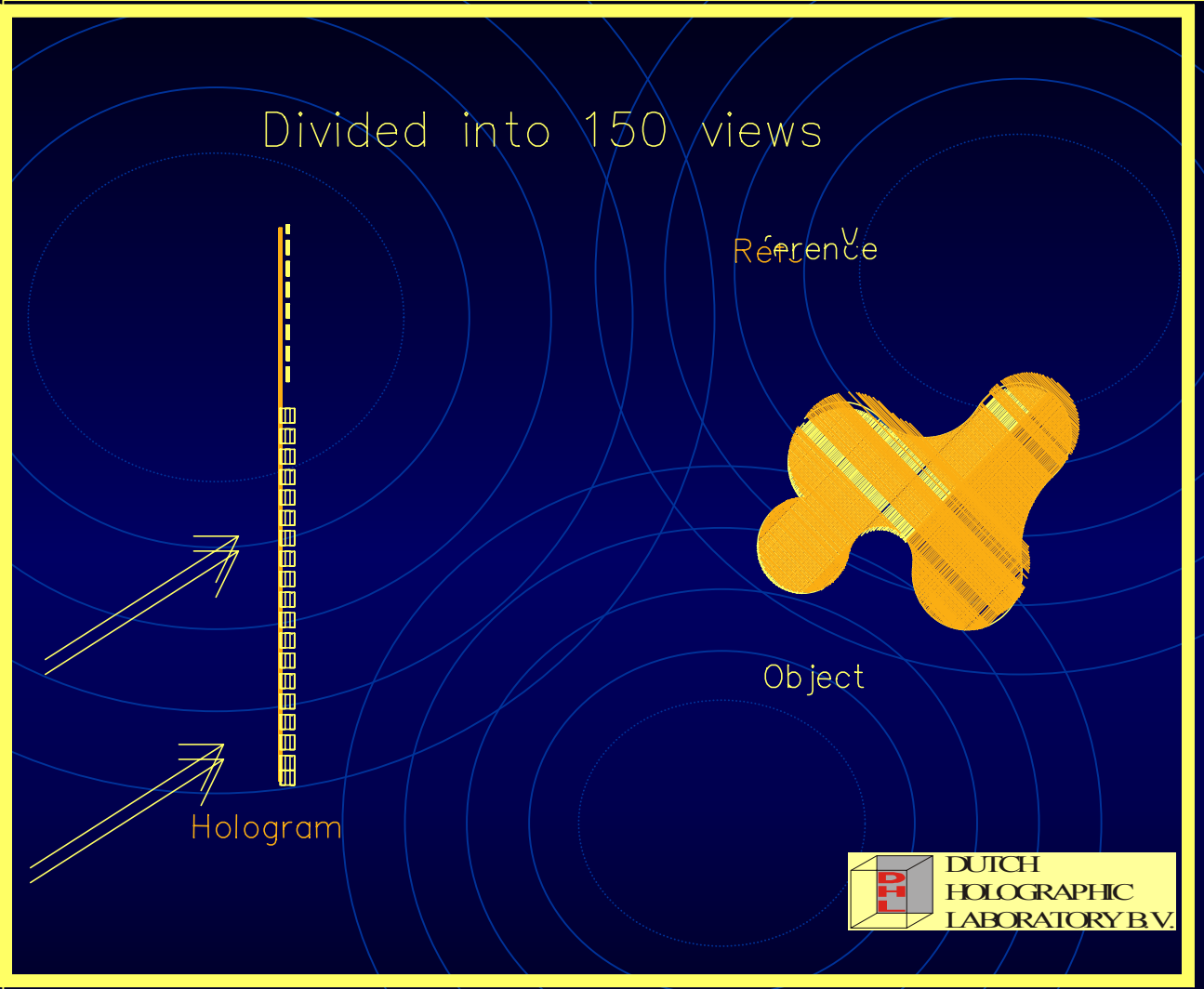
Video

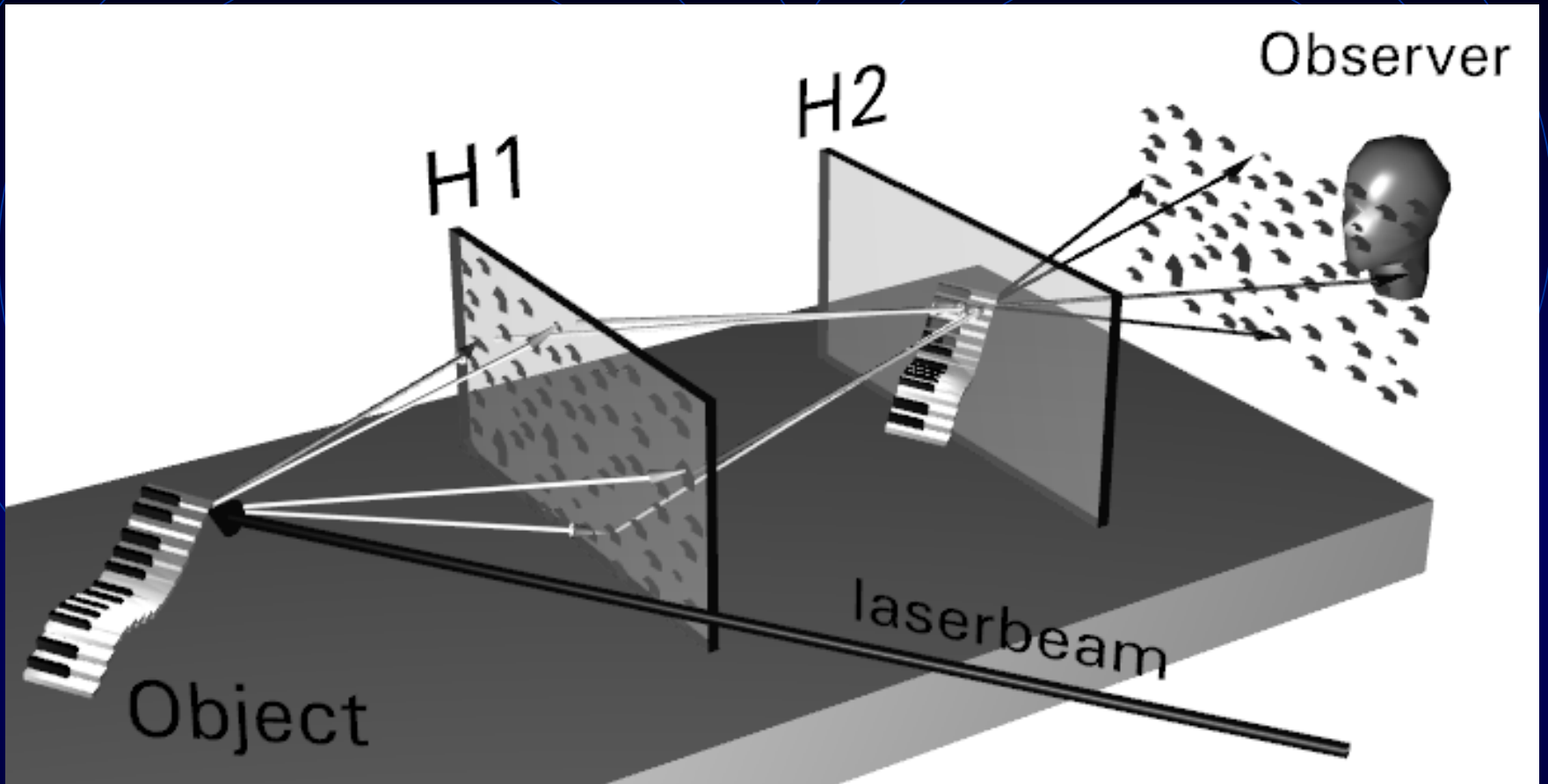
The Office Holoprinter demo tour











Divided into 150 views

