



Glasses, Displays, new developments in 3D

“Stereo 3D technology & human factors” Workshop @ EBU

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Production Systems Television



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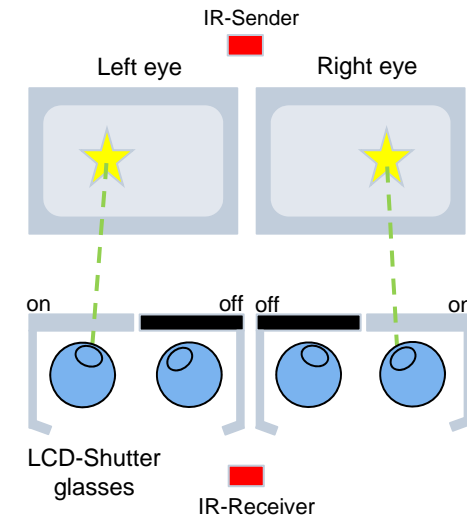
Anaglyph glasses

- Invented in mid of 19th century
- Channel separation by complementary colors (red-cyan, red-green)
 - + Cheap
 - + No special screen
 - + Big auditorium
 - Bad color reproduction
 - No freedom for production studio in color grading
 - Causes headache



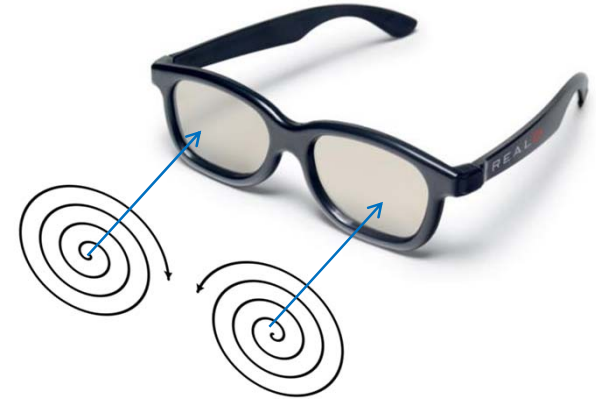
Shutter glasses

- Glasses bound to display type (at the moment)
- Channel separation by frame sequential switching of LCDs in the glasses
- Nearly all 3D capable (CE-) displays working with shutter technology
 - + Full spatial resolution per eye
 - + Head can be tilted
 - + Independent from screen (beamer)
 - Expensive glasses
 - Could cause headache due to shuttering
 - Incompatible with other manufacturers, but there are developments within the industry
 - Battery
 - Loss of luminance
 - Interferences with ambient light



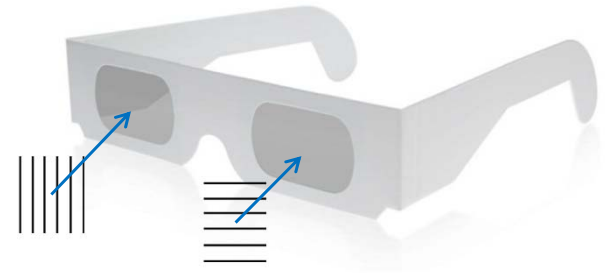
Polarized glasses (circular)

- Channel separation by circular polarization of the light
- Nearly all 3D capable professional displays working with polarized technology due to synchronization issues (e.g. OB Van)
- Polarized technology is starting for CE displays
 - + Cheap glasses
 - + Light glasses
 - + Head can be tilted
 - + Single beamer with rotating z-filter in front
 - Half spatial resolution per eye
 - Loss of luminance
 - Need of special silver screen – expensive



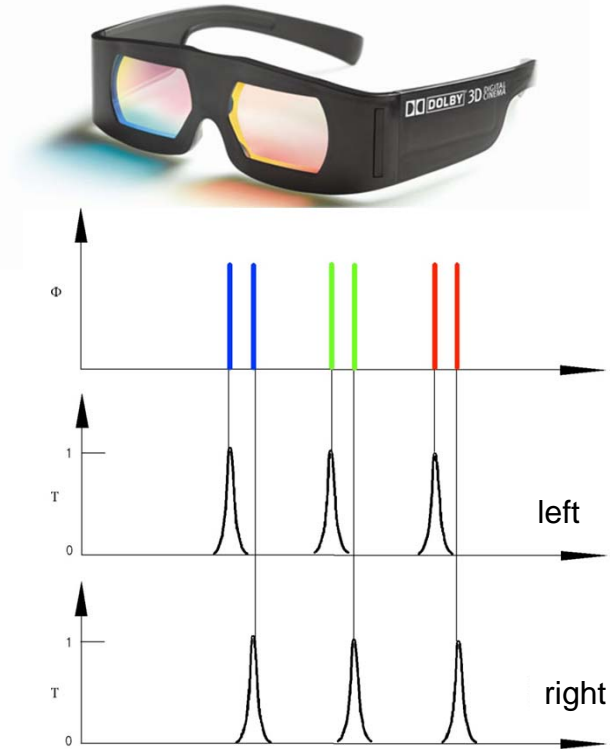
Polarized glasses (linear)

- Channel separation by linear polarization of the light
 - + Cheap glasses
 - + Light glasses
 - Half spatial resolution per eye
 - Head can't be tilted
 - Small loss of luminance
 - Need of special silver screen – expensive
 - Two beamers needed for linear polarization



Infitec / Dolby 3D

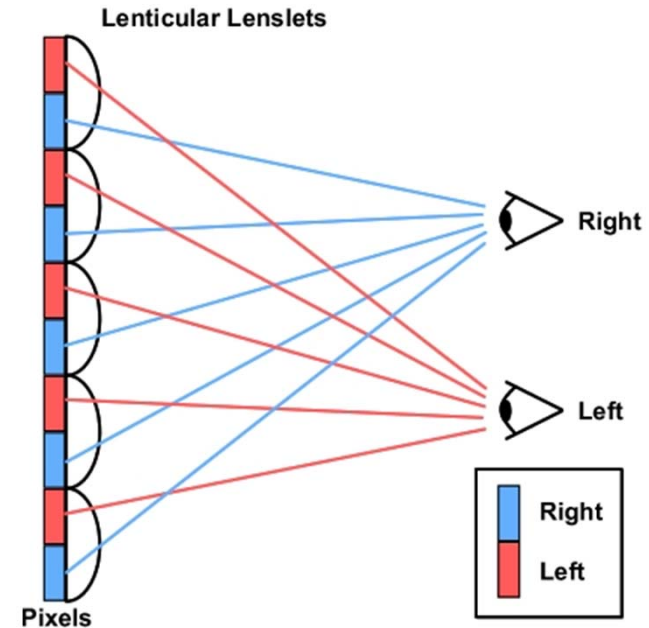
- Channel separation by a color wheel mounted in front of the beamer
- Up to now only in cinemas available
 - + Full spatial resolution per eye
 - + Head can be tilted
 - + Light glasses
 - + No need of special screen
 - + Single beamer
 - Small loss of luminance
 - Expensive glasses and technology for the beamer (well adjusted color wheel, synchronization server)



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Auto-stereoscopic & Multi-view

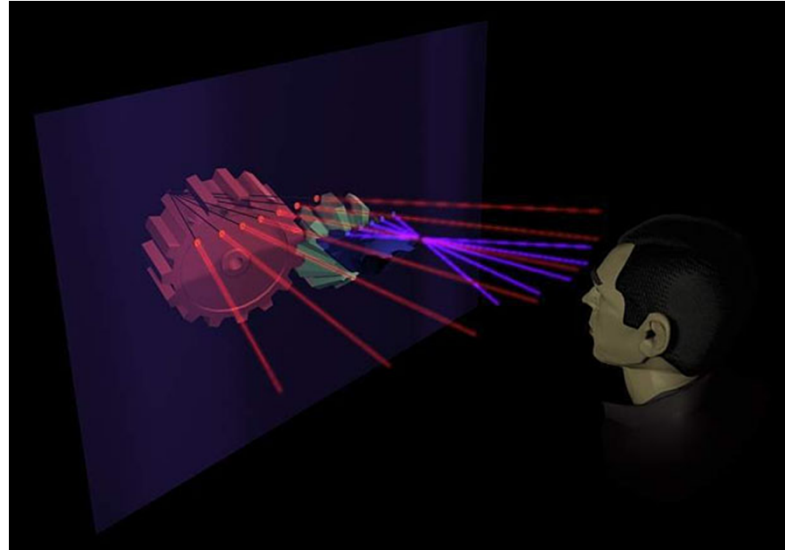
- Channel separation by system of lenses (prisms) in front of the screen
- Multiple viewing slots (typical 5-8)
- Still in development (needs at least 5 to 10 years), only prototypes
 - + Number of viewers
 - + No glasses
 - Spatial resolution per eye depends on source material and number of views
 - Head can be tilted (but very restricted)
 - Barriers between views



www.3d-forums.com

Holography?

- Walking around the “picture” without glasses?



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Viewing 3D @ home



DVB
Digital Video
Broadcasting

Making 3D @ home





Thanks for your attention.

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