



**CREATE-IT**  
APPLIED  
RESEARCH

# DISPLAY TECHNOLOGY

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Hogeschool van Amsterdam UvA  UNIVERSITEIT VAN AMSTERDAM



# INHOUD

- Terugblik op de Week 1
- Display Technology
  - Geschiedenis en werking
  - Verschillende soorten
  - Speciale gevallen

Arduino pro mini

Practicum 2



# TERUGBLIK WEEK 1

- Rol van Technologie in Intelligent Environments
- Ons gereedschap
  - MicroControllers
  - Sensoren
  - Actuatoren

## Practicum opdracht



# DISPLAY



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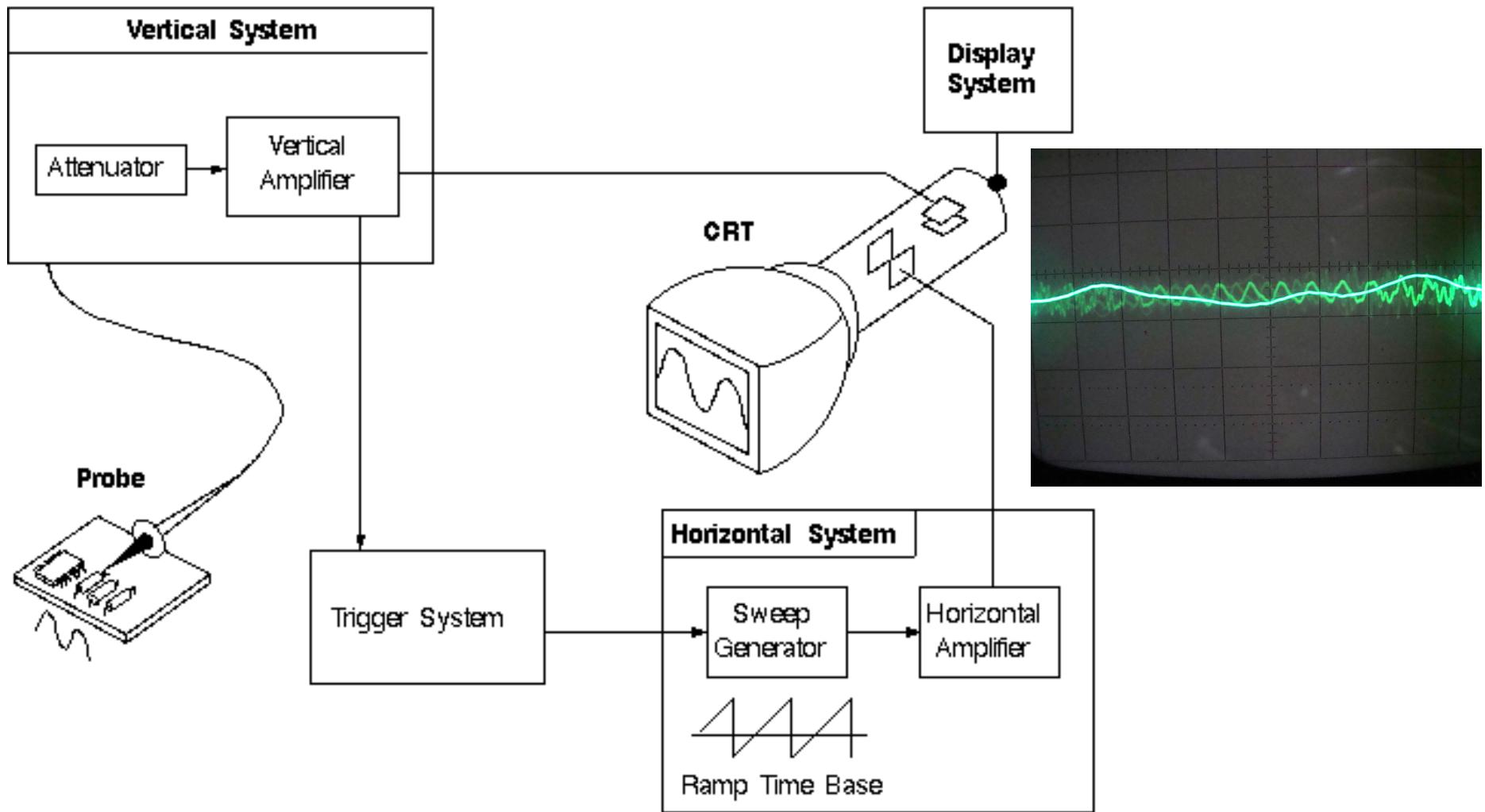
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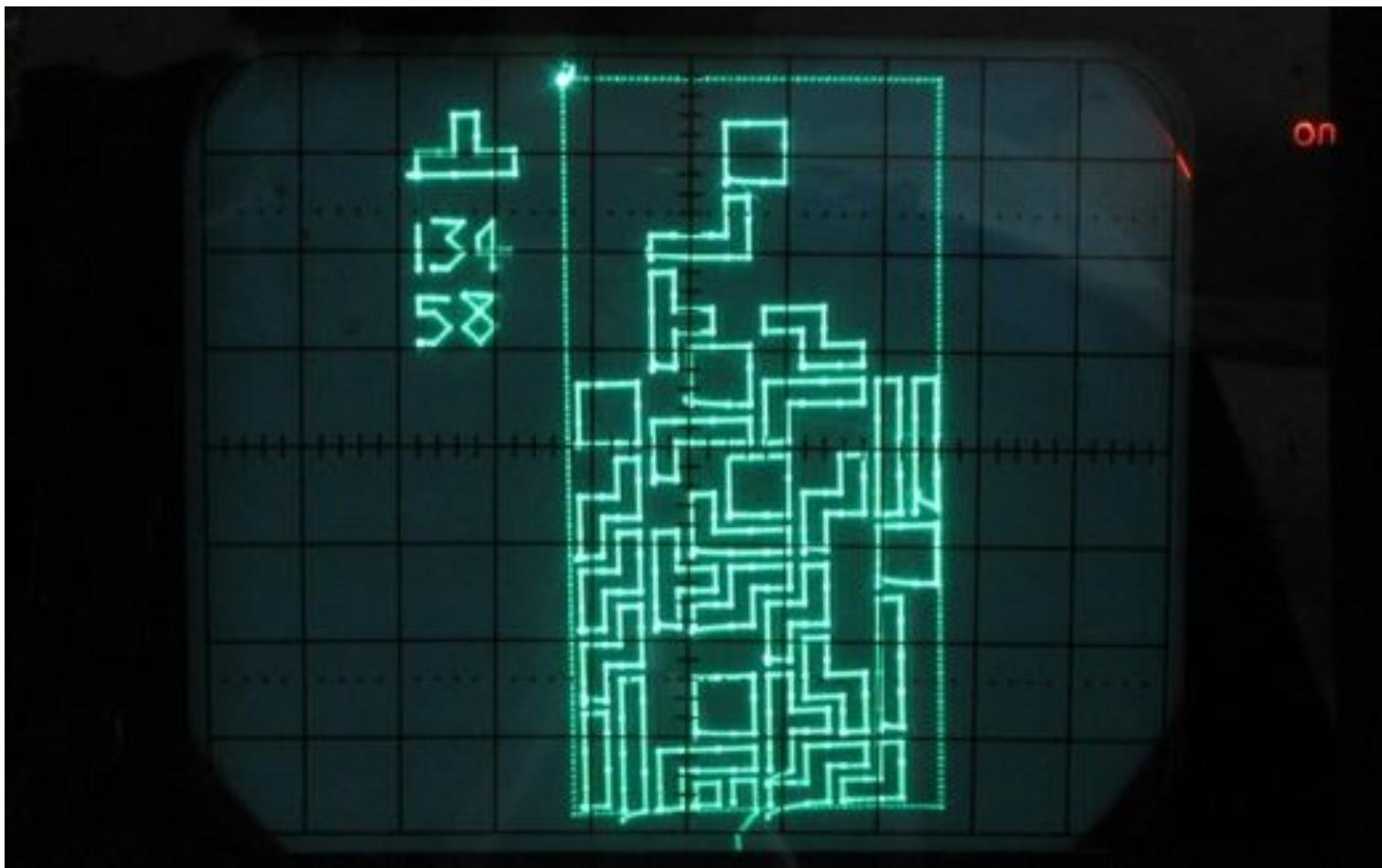
# BRAUN TUBE (1897)



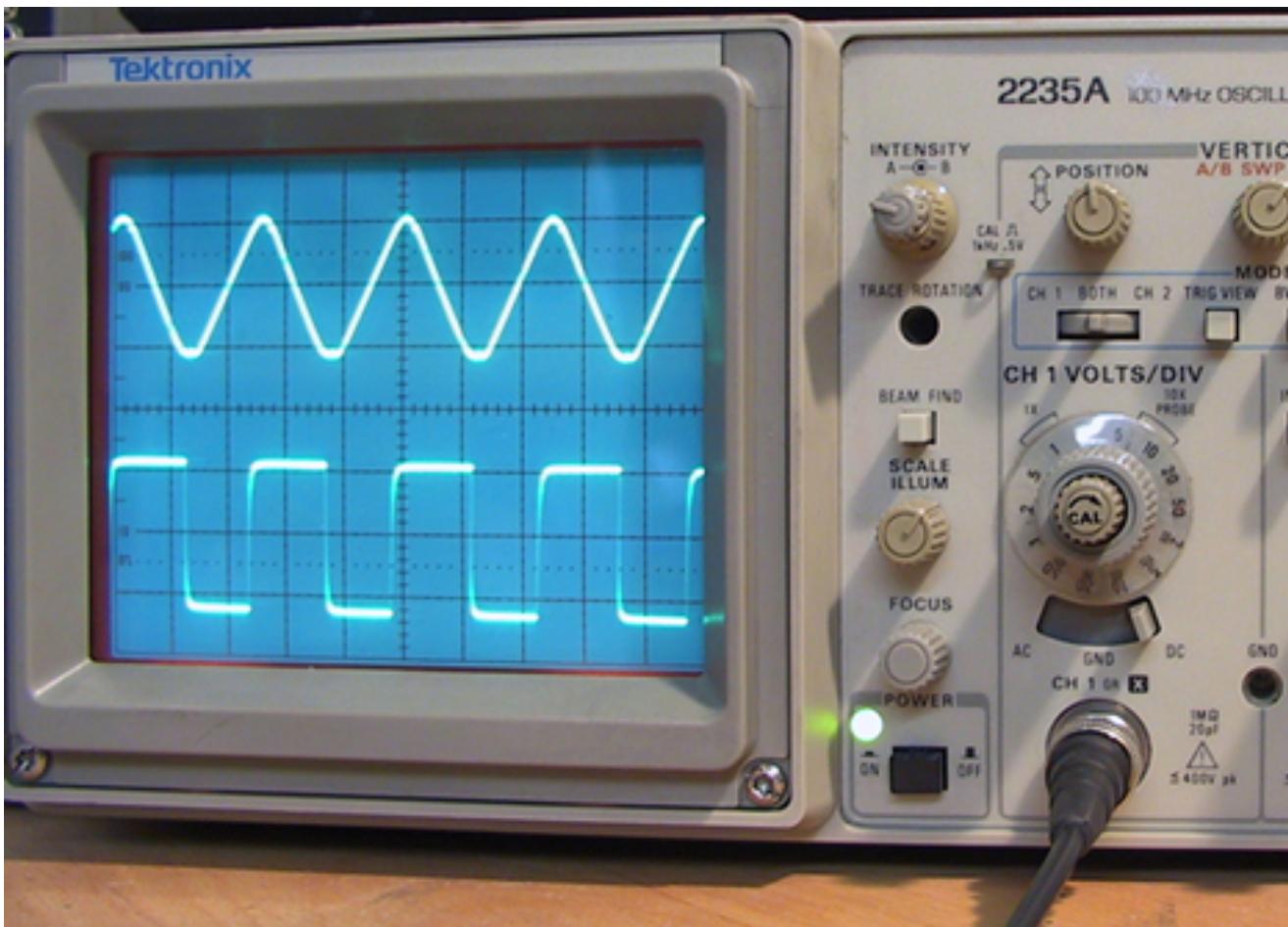
# OSCILLOSCOPE



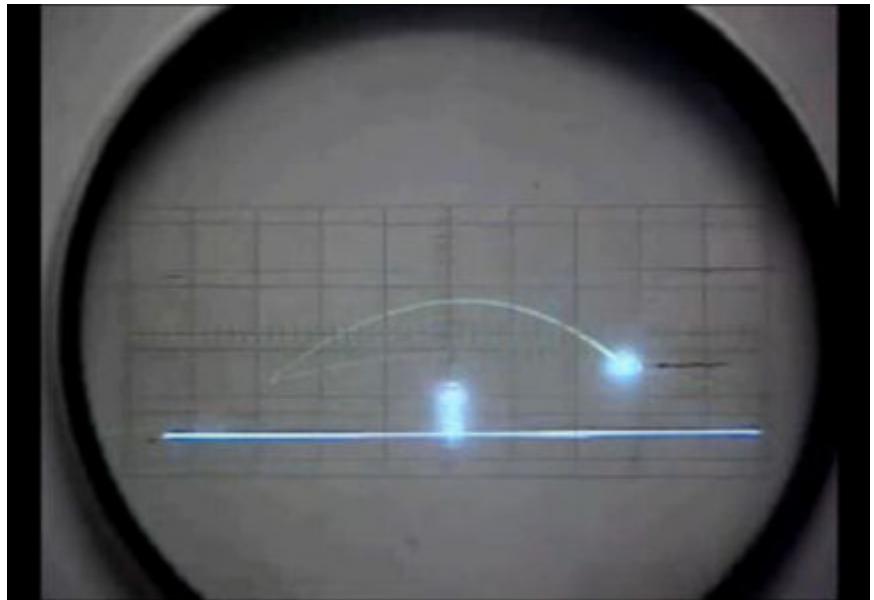
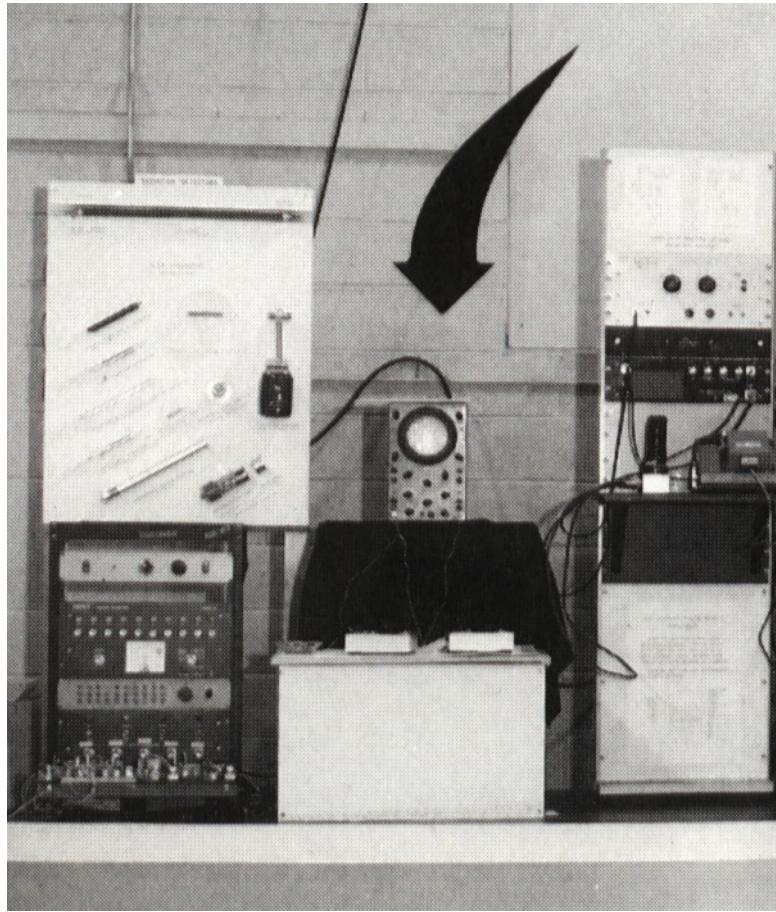
# OSCILLOSCOPE XY-MODE



# VECTOR



# TENNIS FOR TWO (1958!)



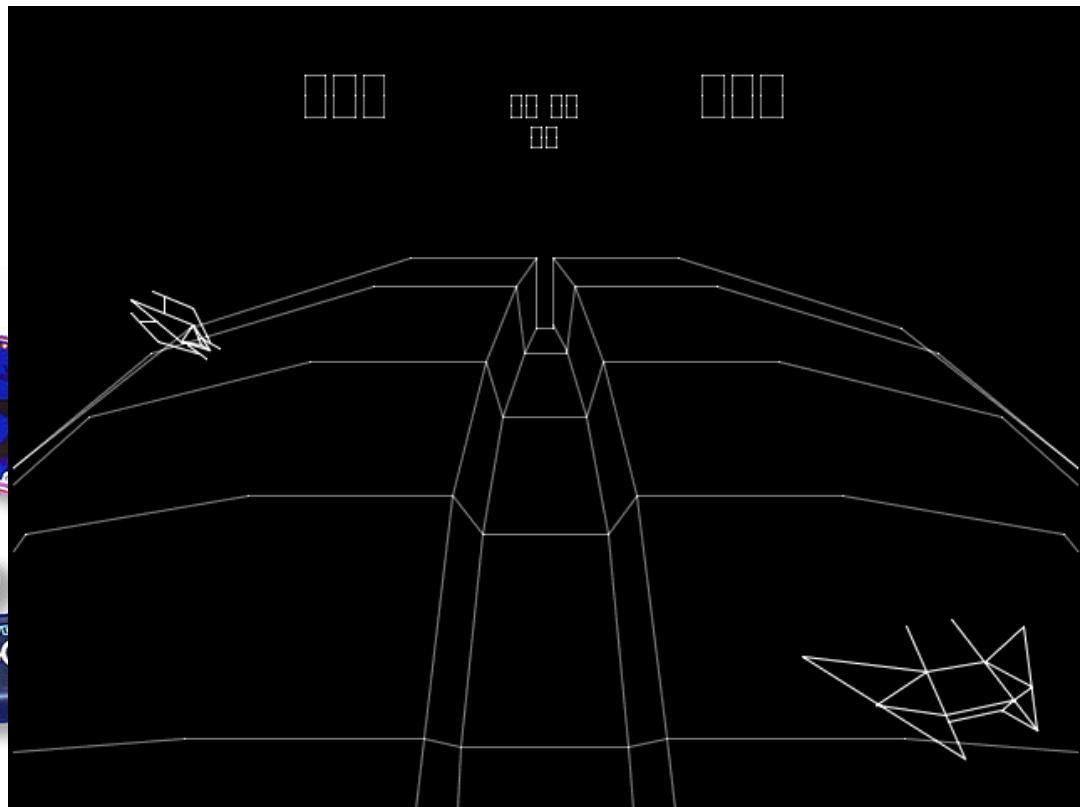
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# VECTREX



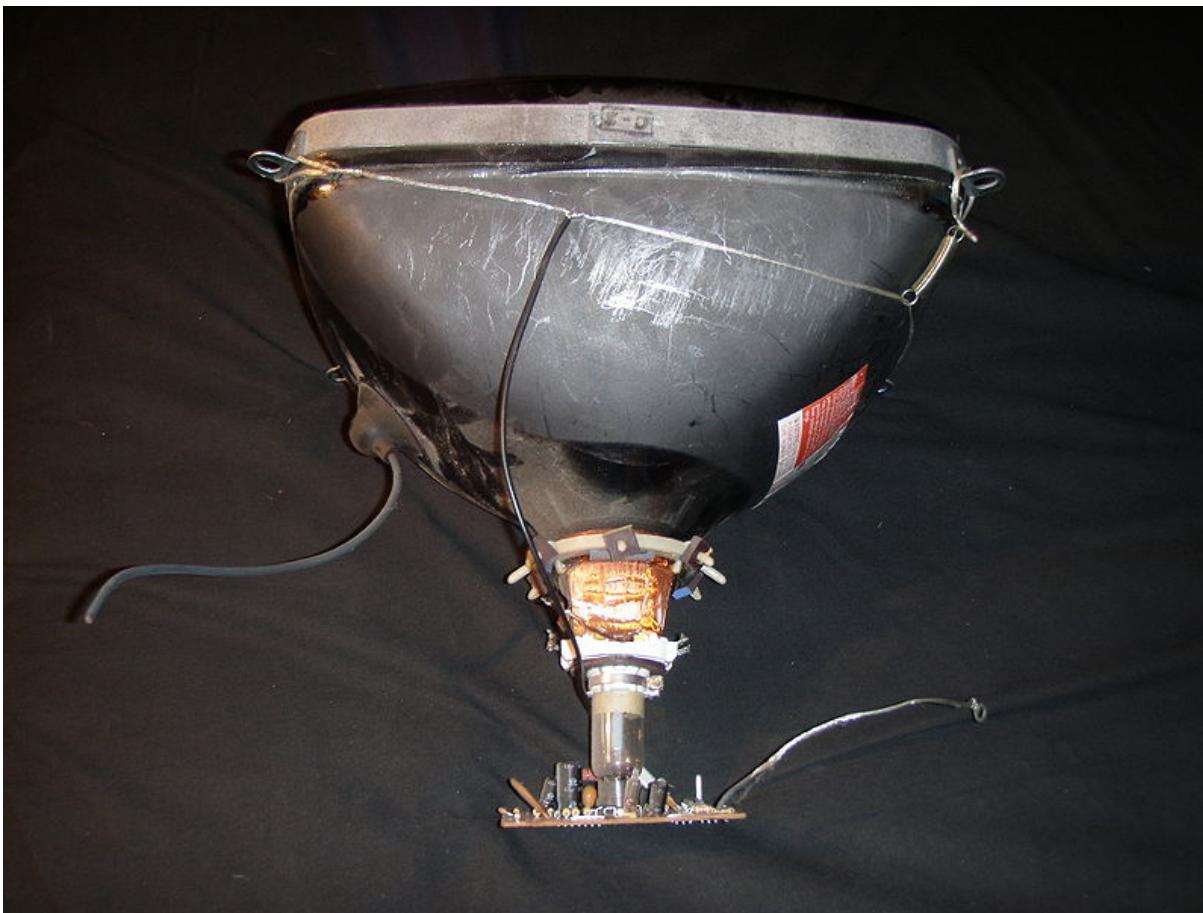
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# CRT TV



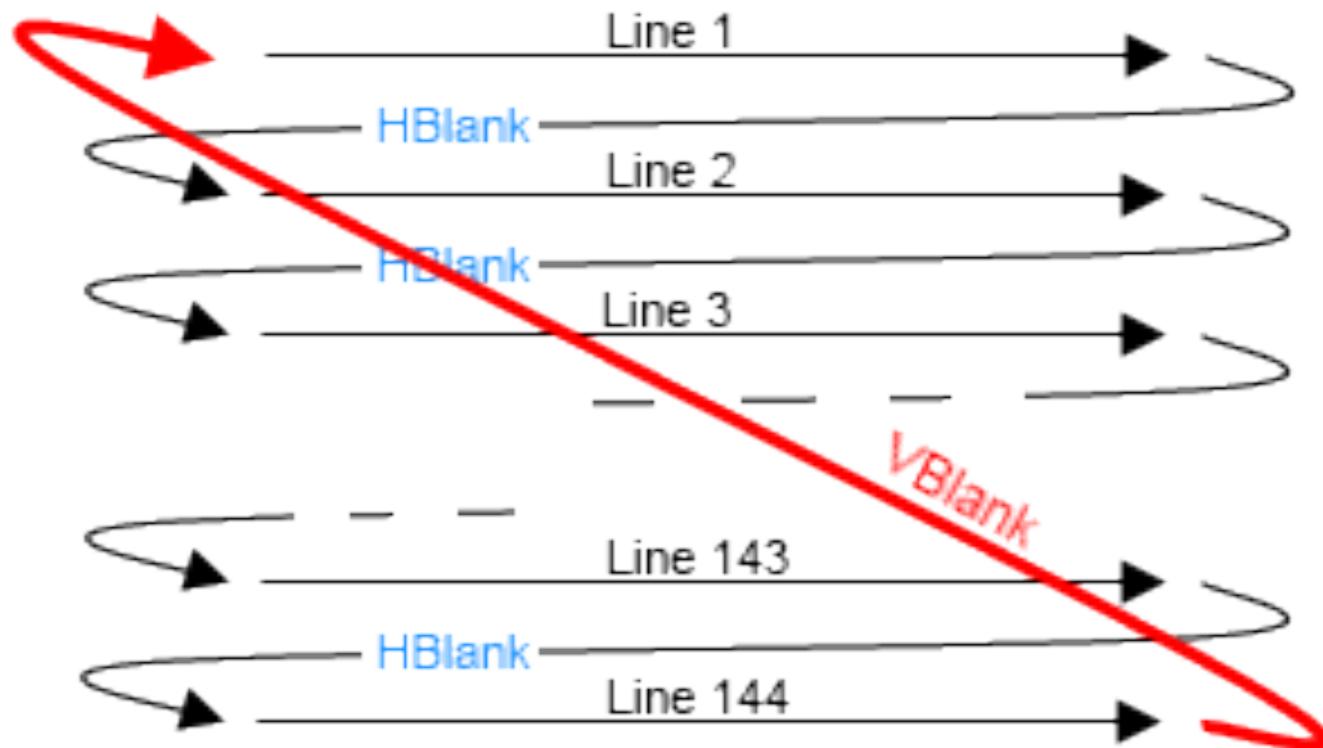
# CATHODE RAY TUBE



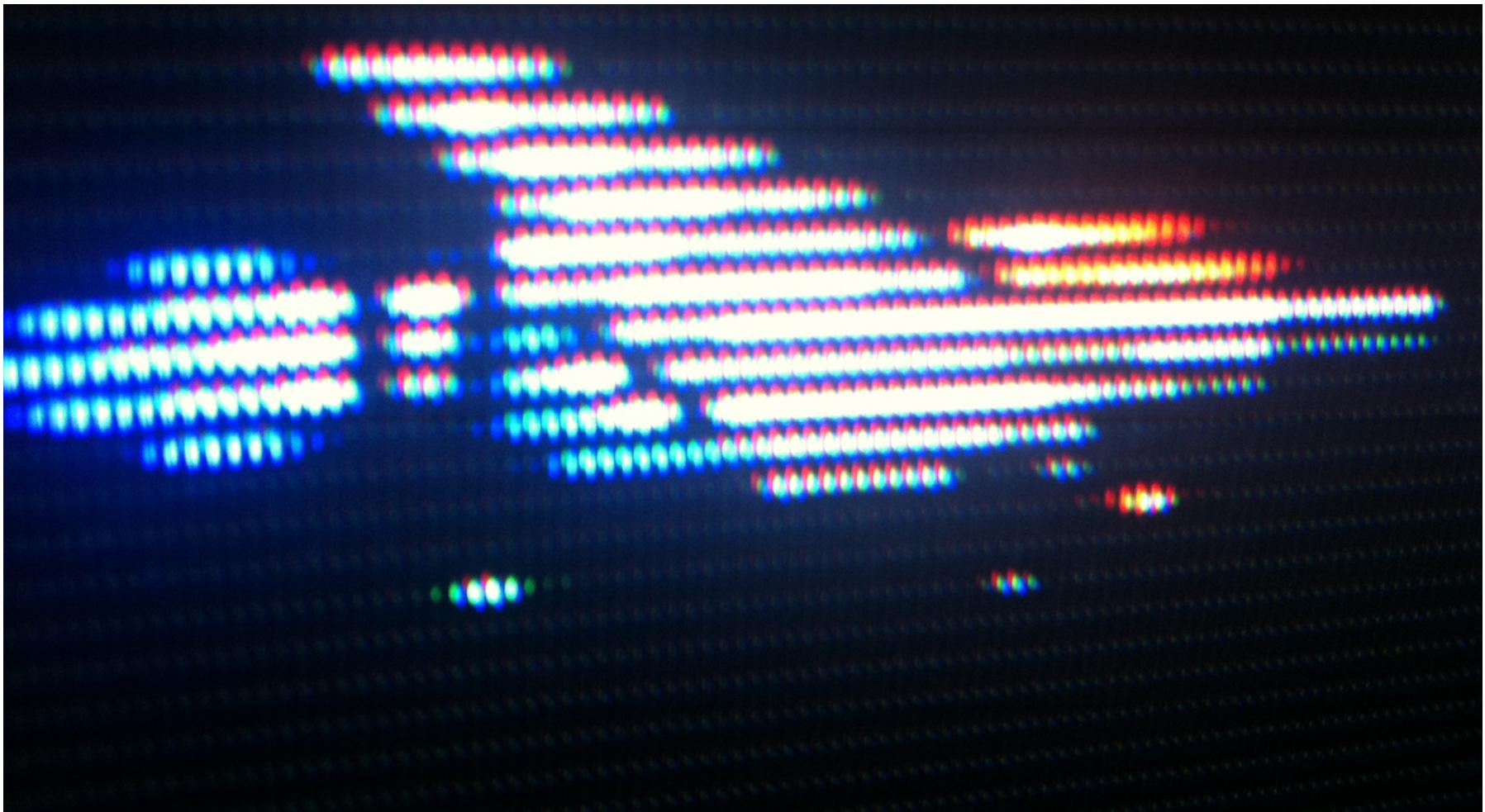
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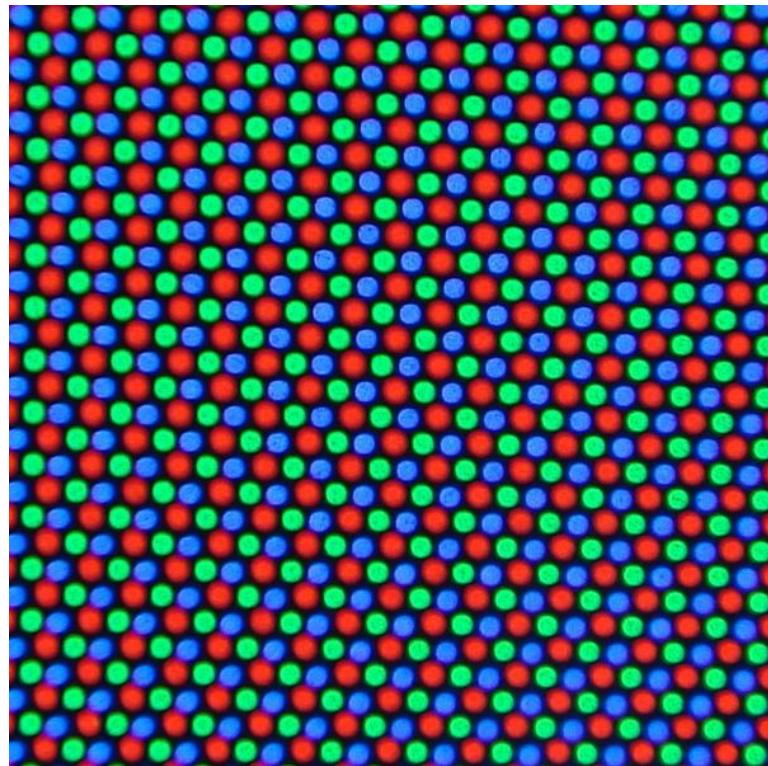
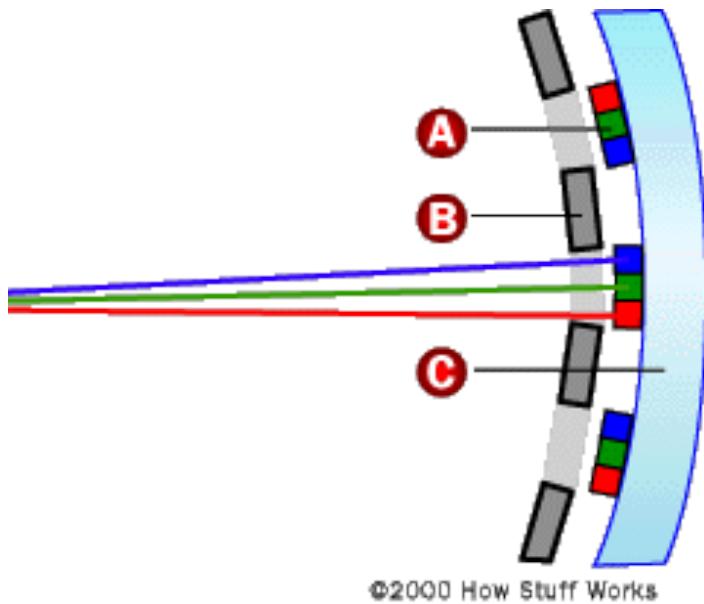
# CRT REFRESH



# SCAN LINES



# CRT KLEUR



# CRT EN WAARNEMING

- Pixels → Beelden
- Flikkering → Continu beeld (>15 fps)
- Beelden → Beweging
- Je brein integreert!



# R.I.PLASMA



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# En LCD dan?



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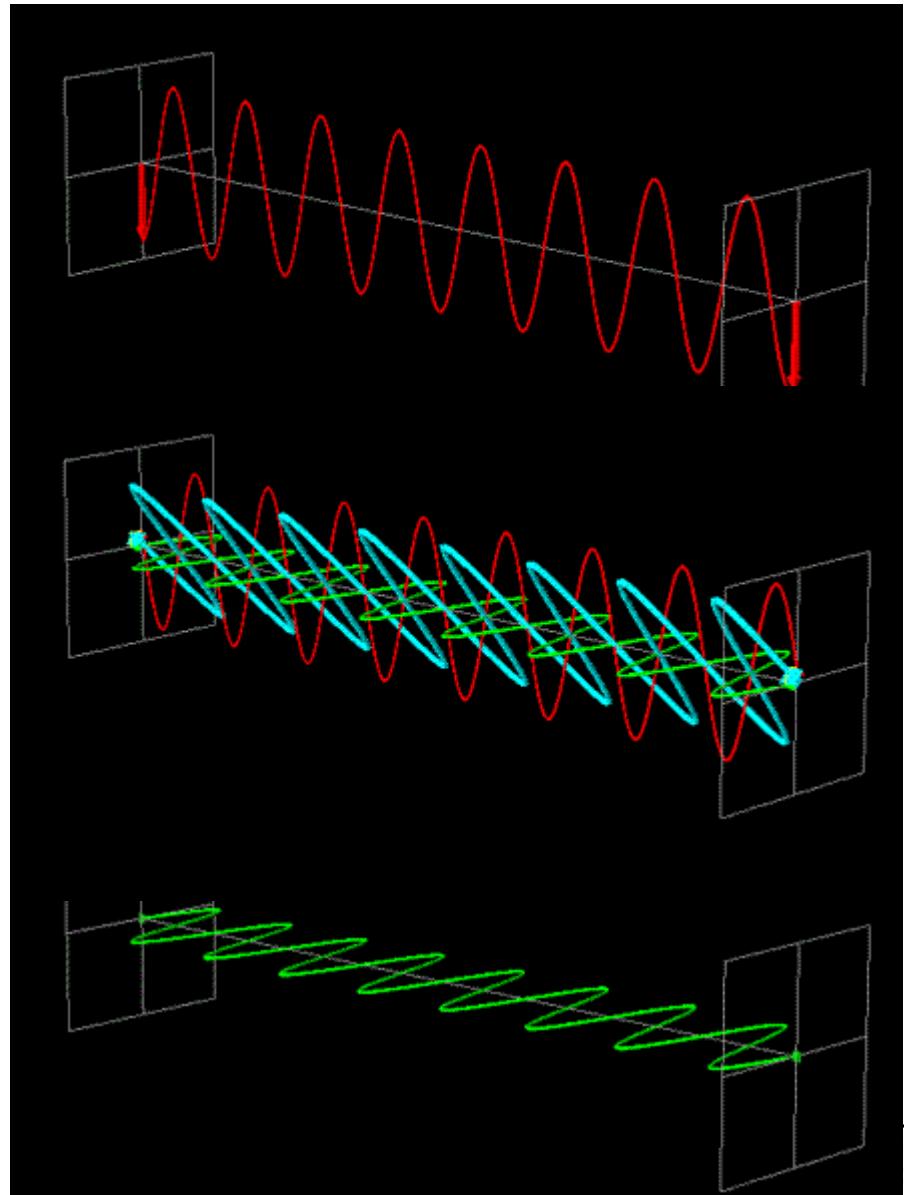


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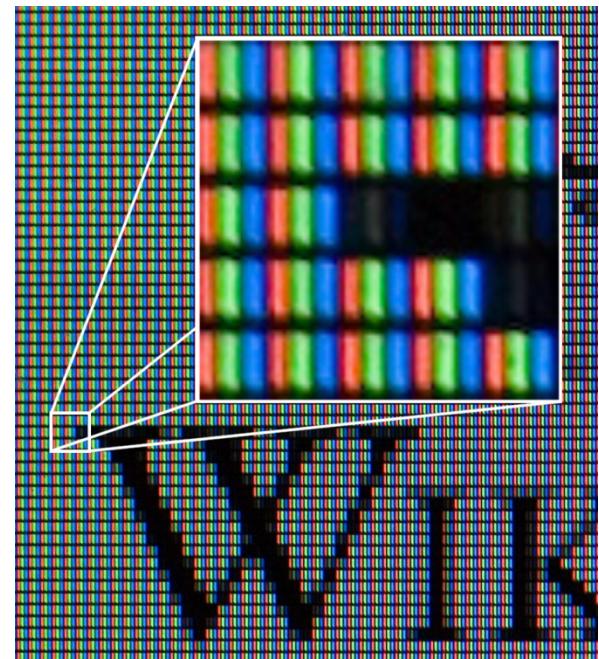
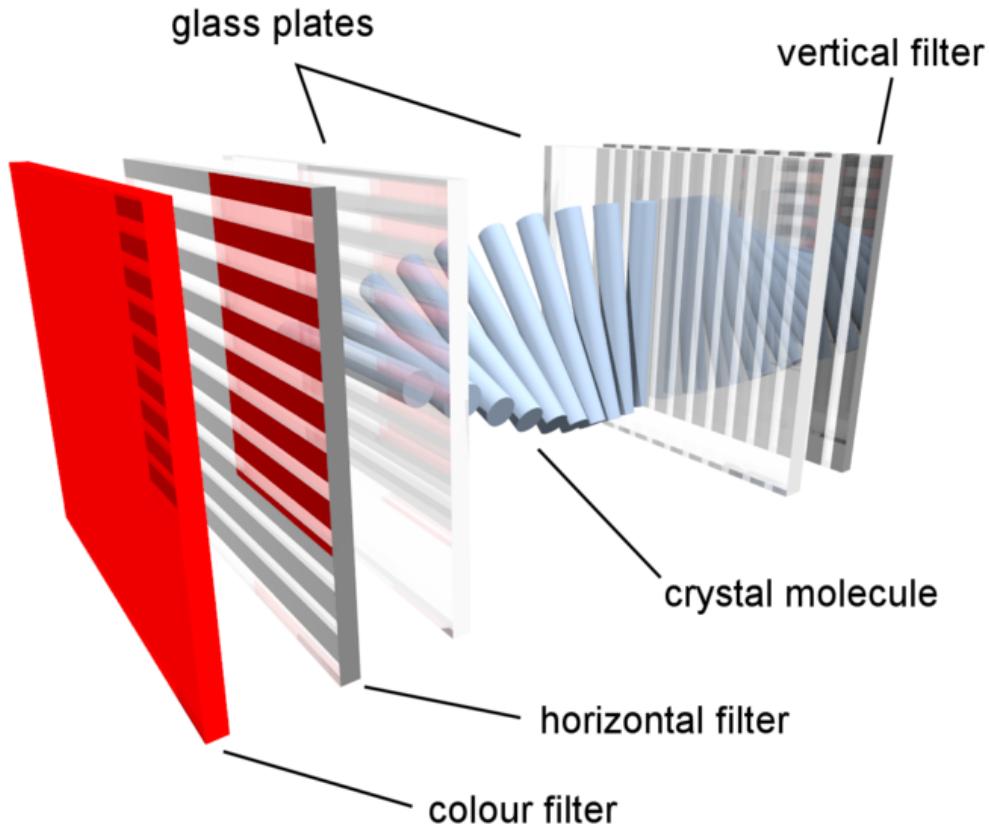


# POLARISATIE

- Light heeft
  - Een reisrichting
  - Een trillingsrichting
- Polarisatie filtert trillingsrichting



# LCD



# RASTER



1920 x 1080  
(HD)  
1280 x 720 (HD)  
640 x 480 (VGA)



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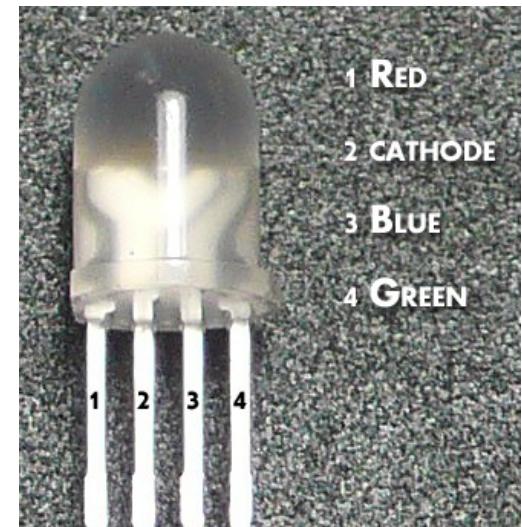


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# LED DISPLAY



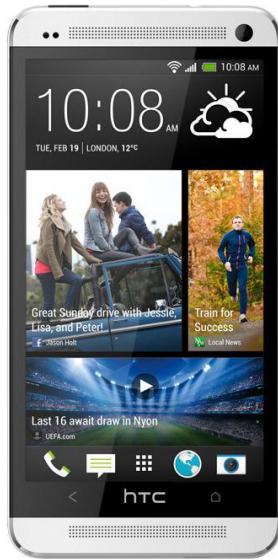
# Projector/Beamer

Lage resolutie  
Groot scherm  
Lange kijkafstand





# KLEINER...



1080 x 1920



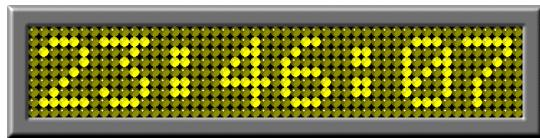
640 x 960



320 x 240



96 x 65



64 x 9



1 x 1



# WAT KUN JE MET 1 PIXEL/LED

- Status
  - Power
- Signaal
  - Knipperen
  - Verkleuren



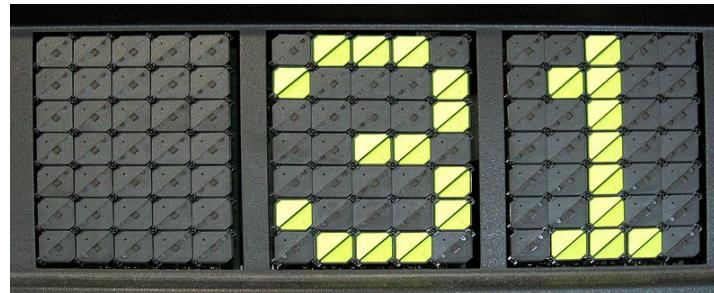
# VERSCHILLENDENDE SOORTEN

- Raster
- Mechanisch
- Vector
- 3D



# MECHANISCH

- Rolbord
- Split flap
- Flip disc



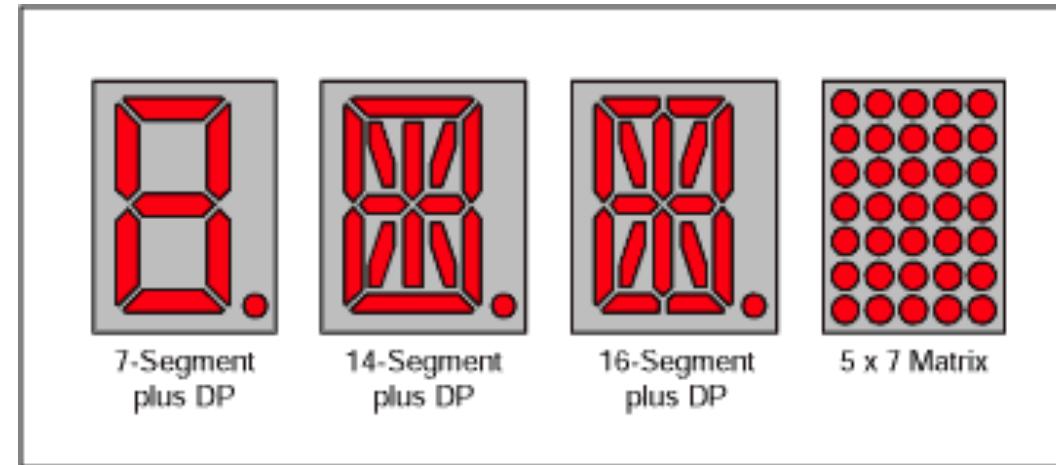
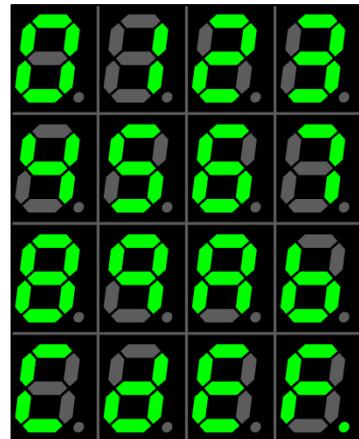
# BRAILLE DISPLAY



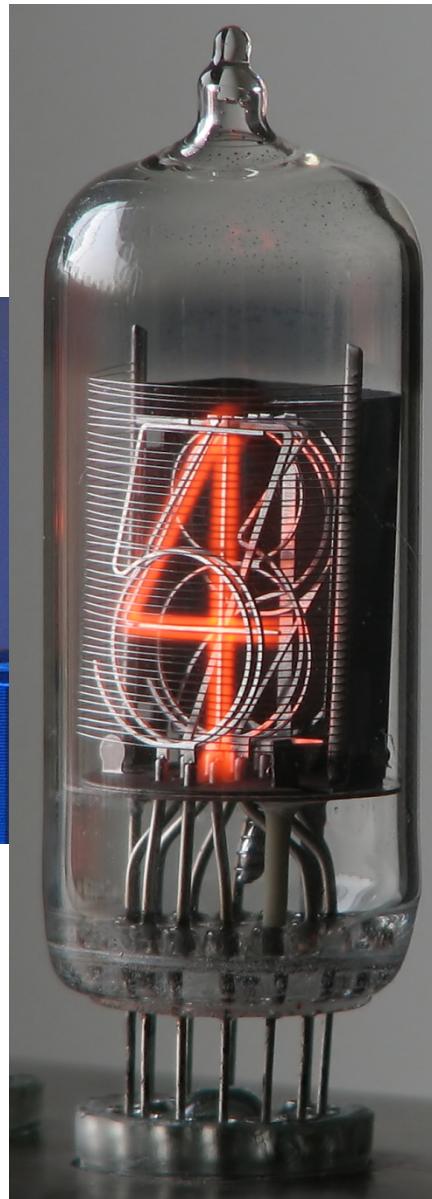
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# 7/14/16-SEGMENT



# NIXIE TUBE



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# STEREO

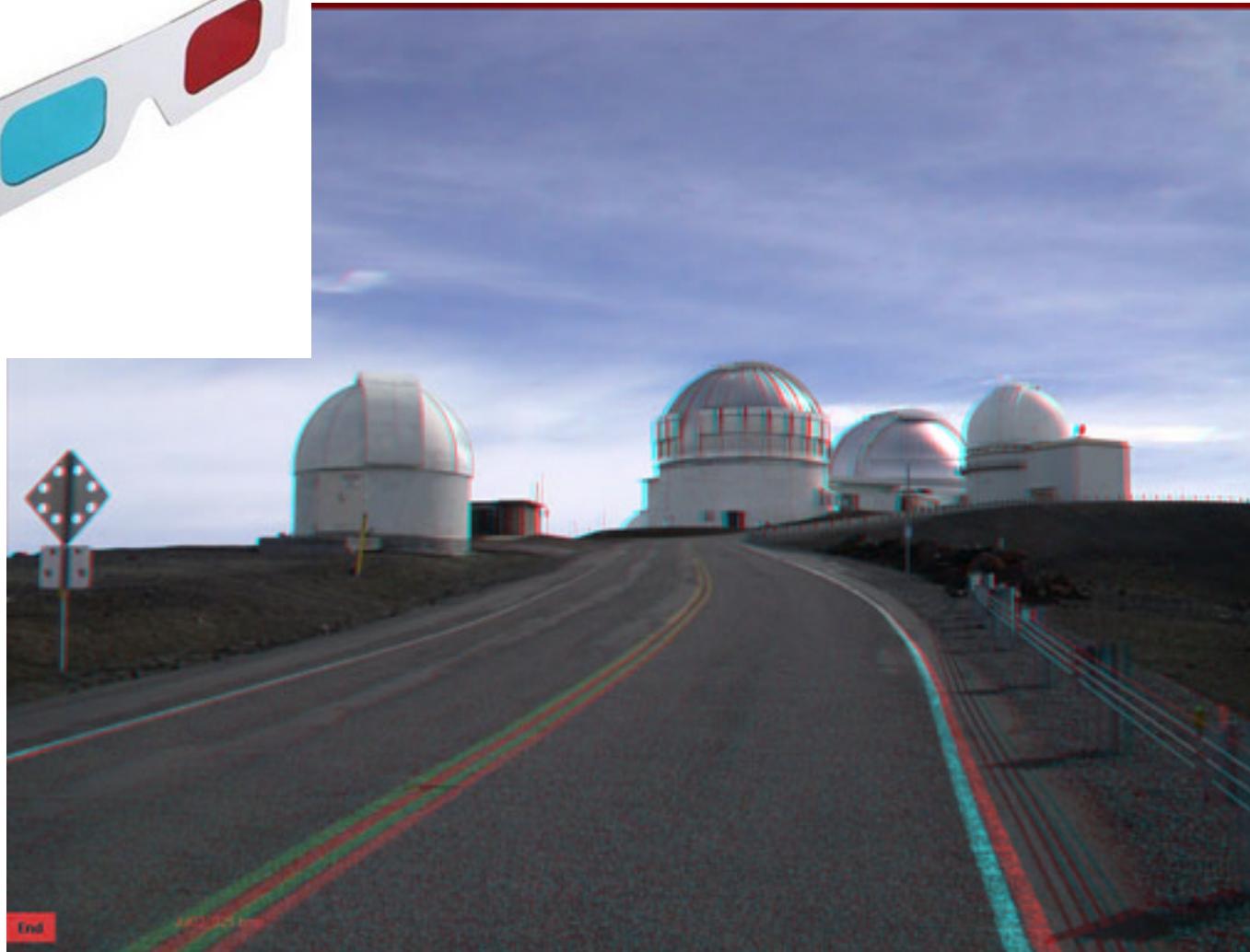


# STEREO



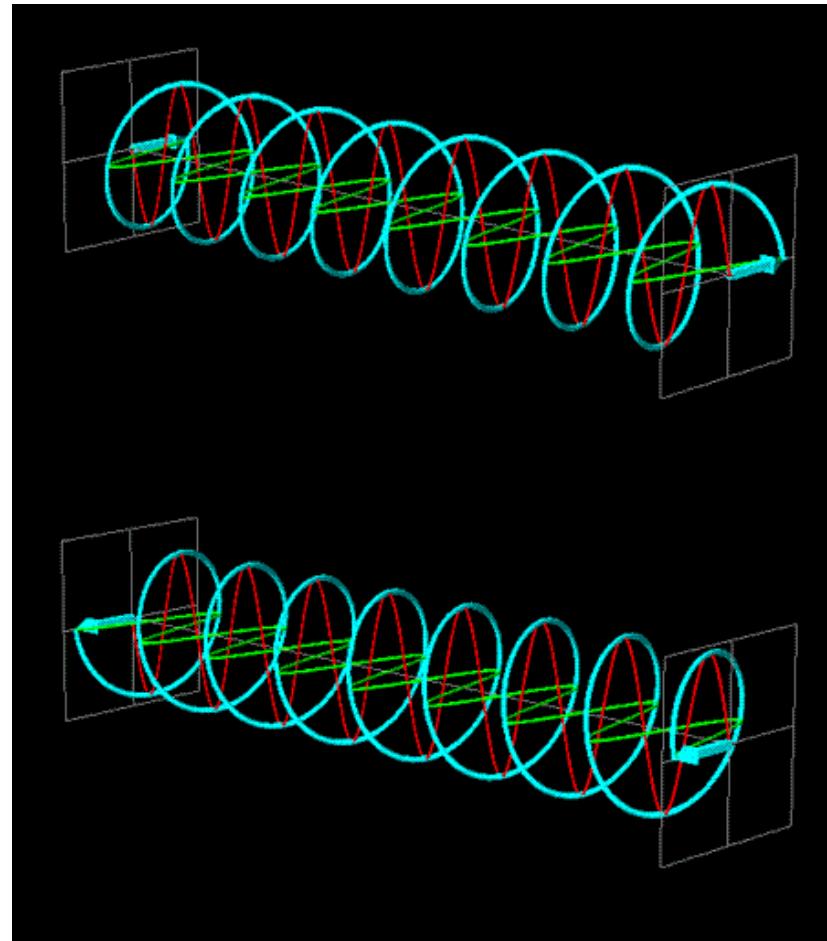


# ANAGLYPH



# STEREO MET BRIL

- Anaglyph
  - Verlies van kleur
- Shutter glasses
  - Moet synchroniseren met display
- Polarisatie
  - Mag hoofd niet kantelen
- Circulaire Polarisatie



# HEAD MOUNTED DISPLAY



# HEAD MOUNTED DISPLAY

GLASS



# HEAD MOUNTED DISPLAY



# HEAD MOUNTED DISPLAY

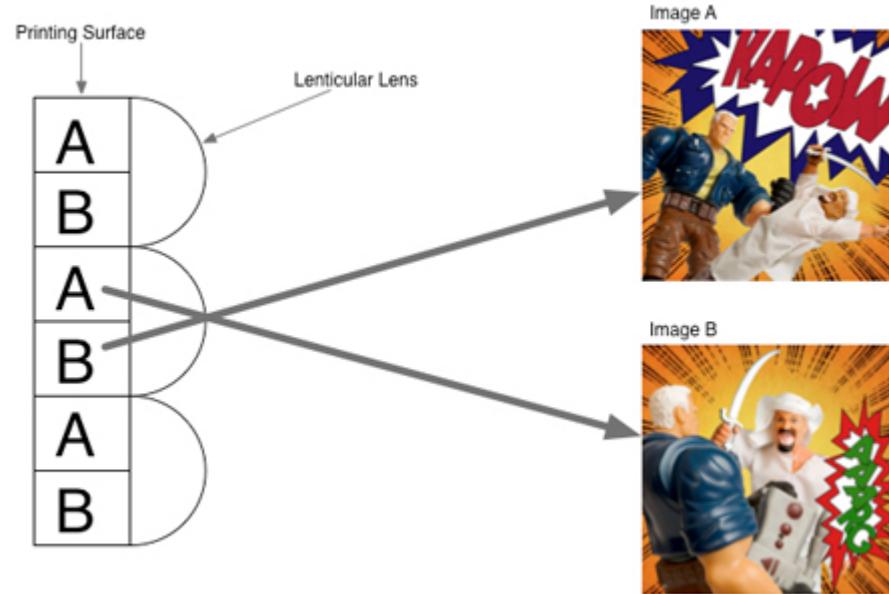


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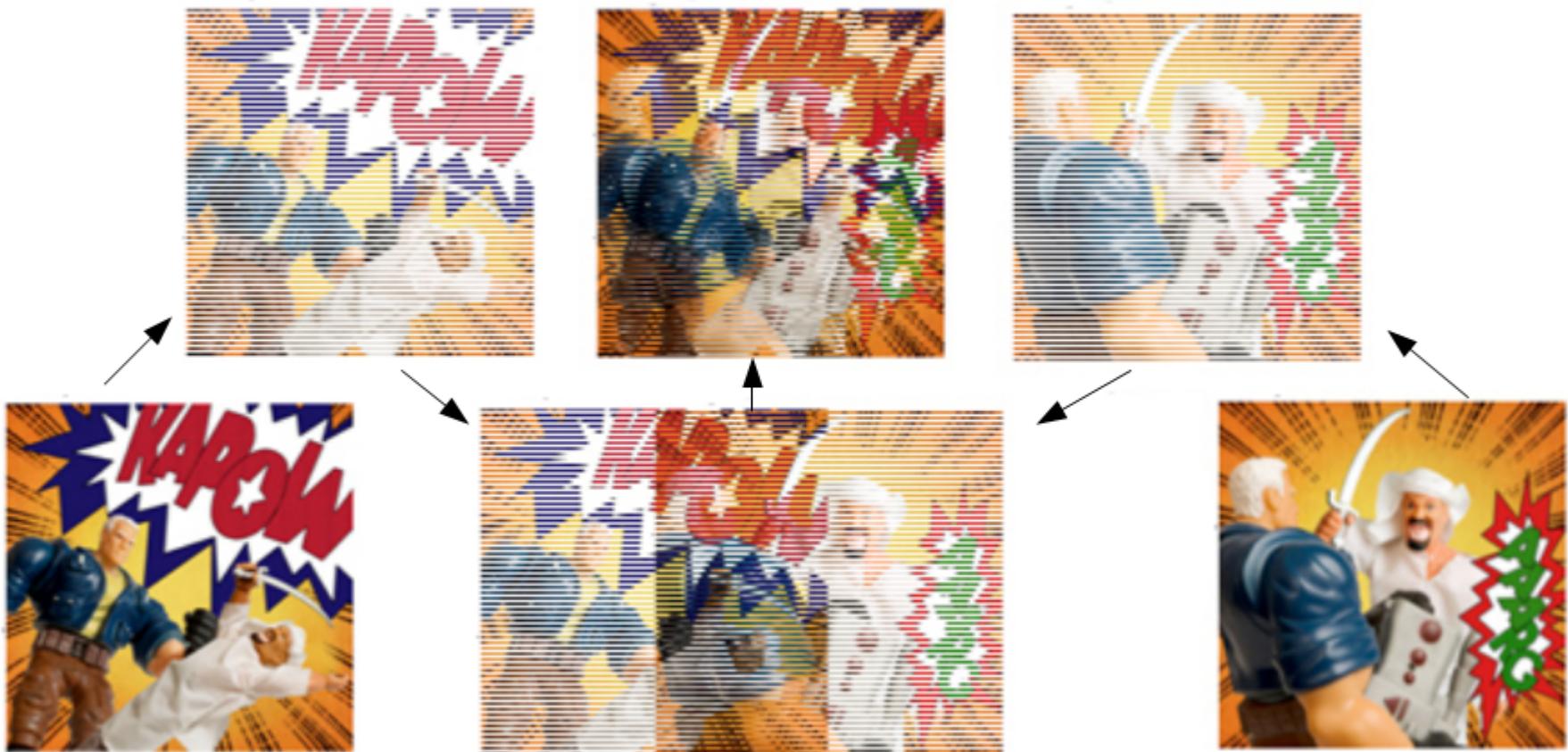


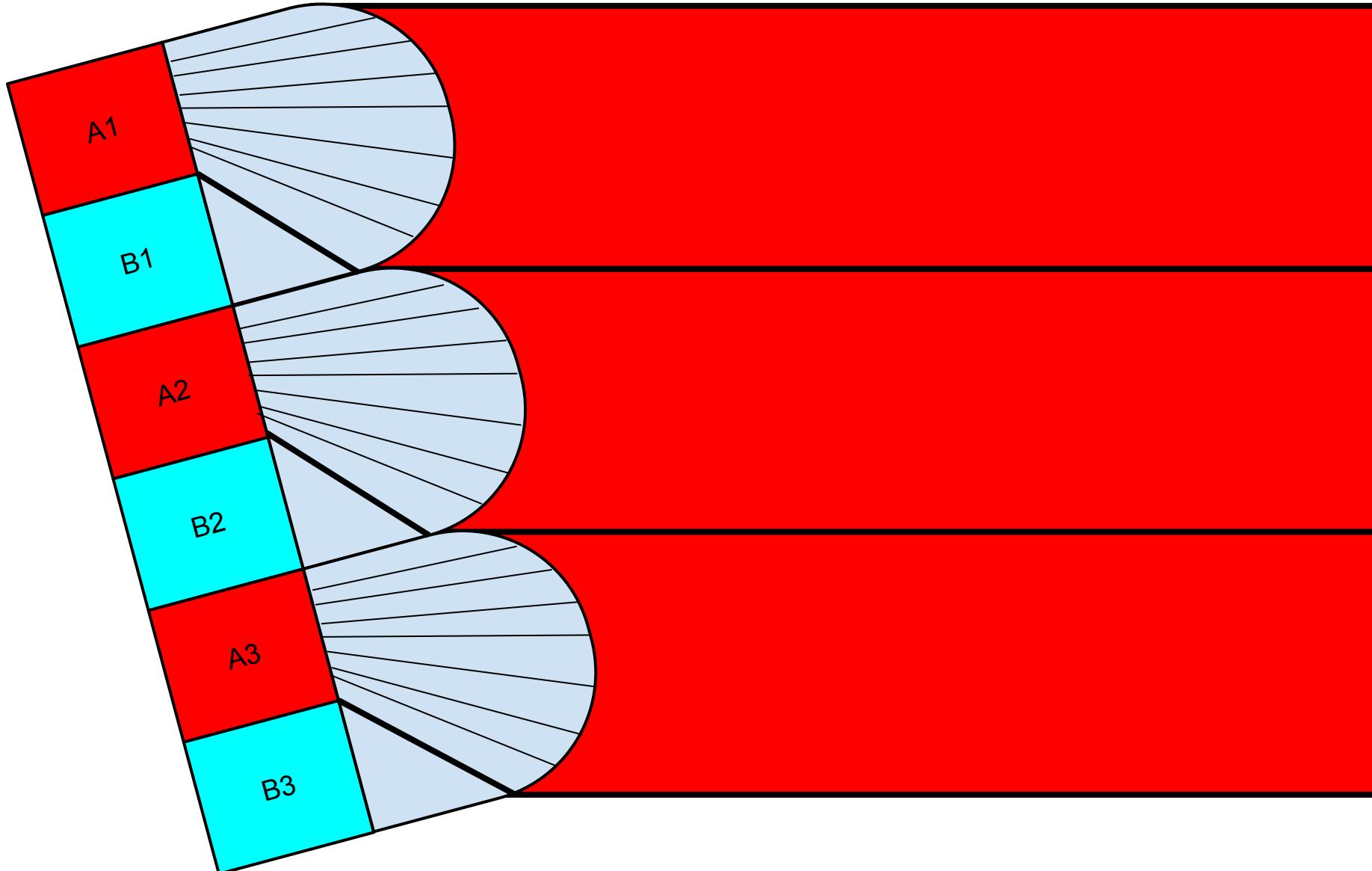
# STEREO ZONDER BRIL

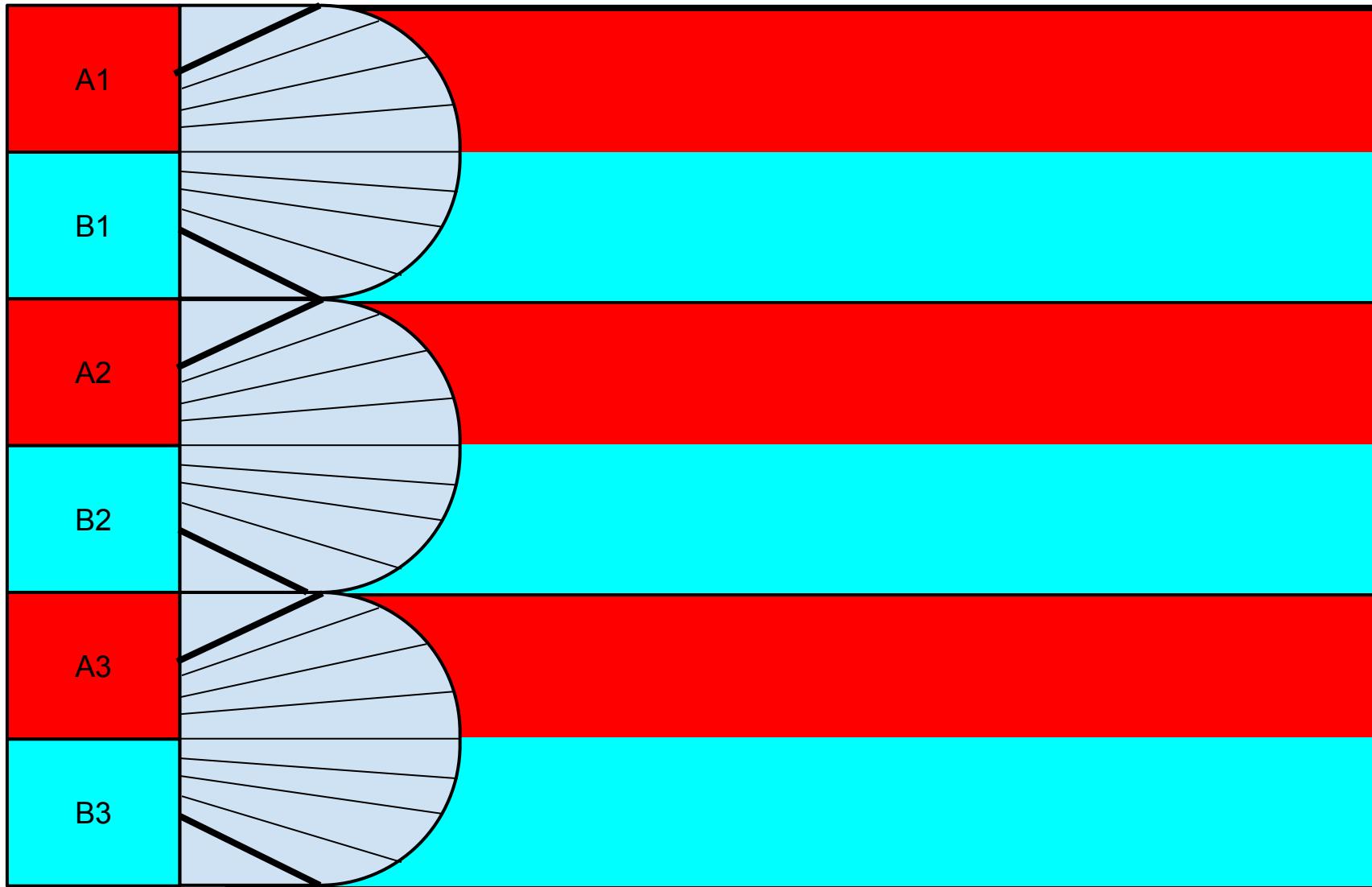
- Lenticulaire lens
- Meerdere standpunten

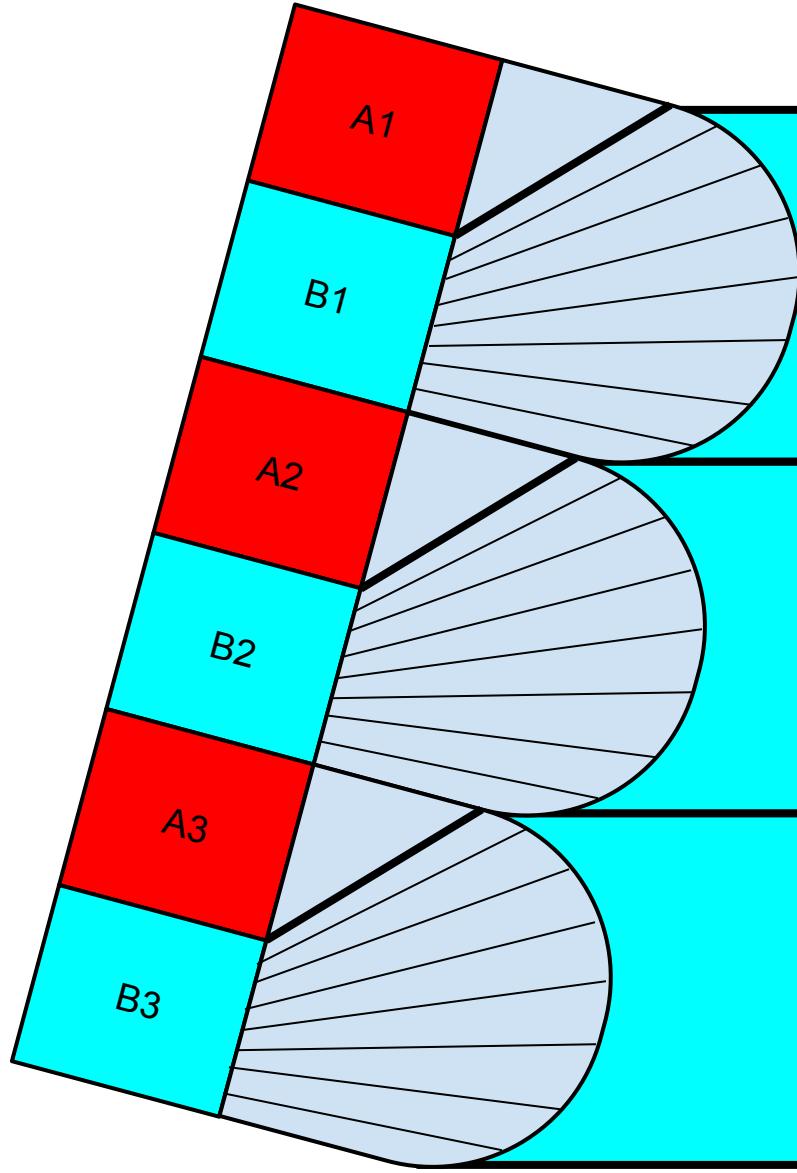


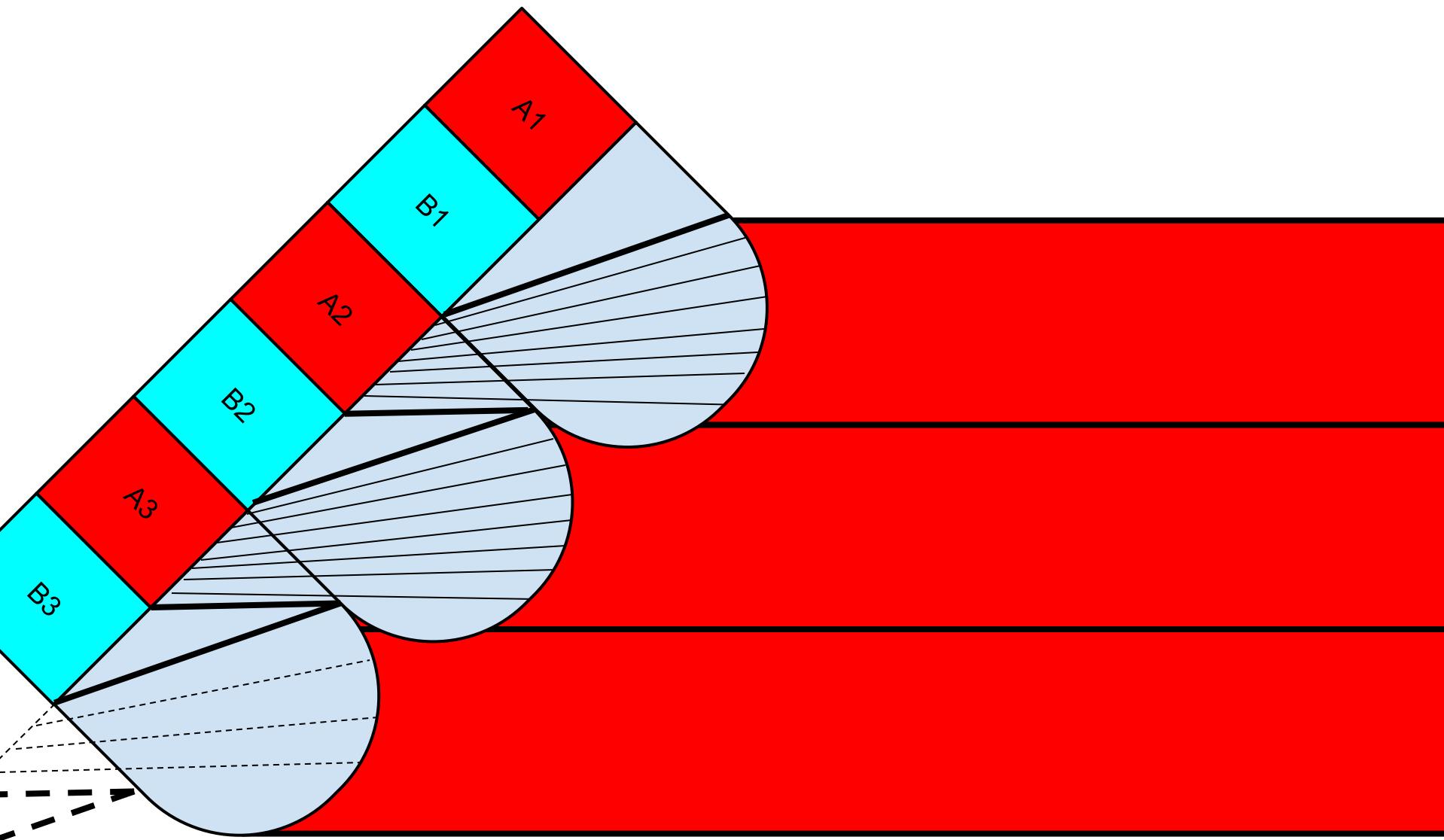
# STEREO ZONDER BRIL

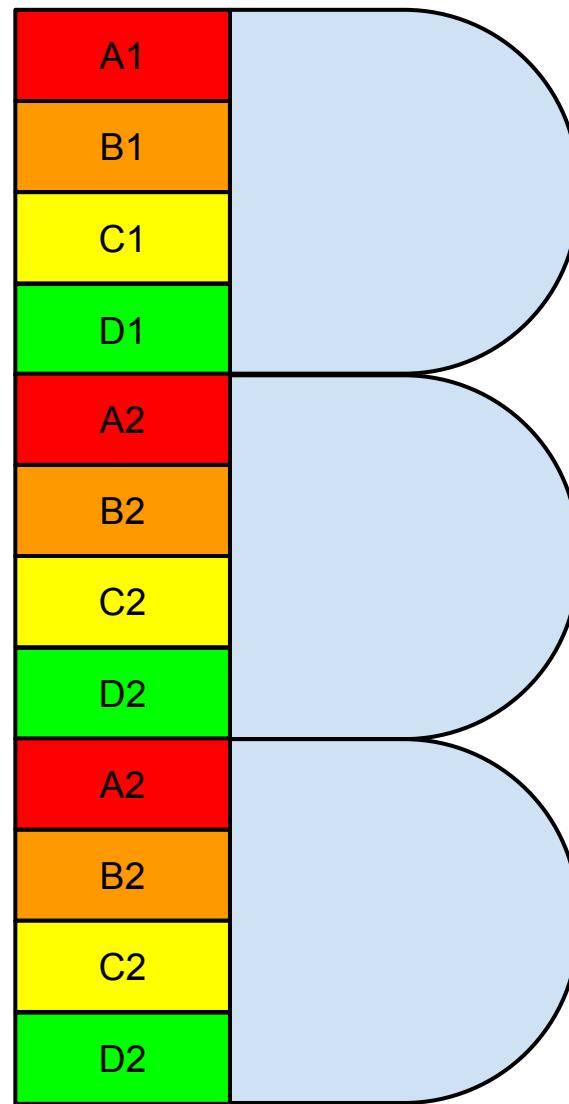






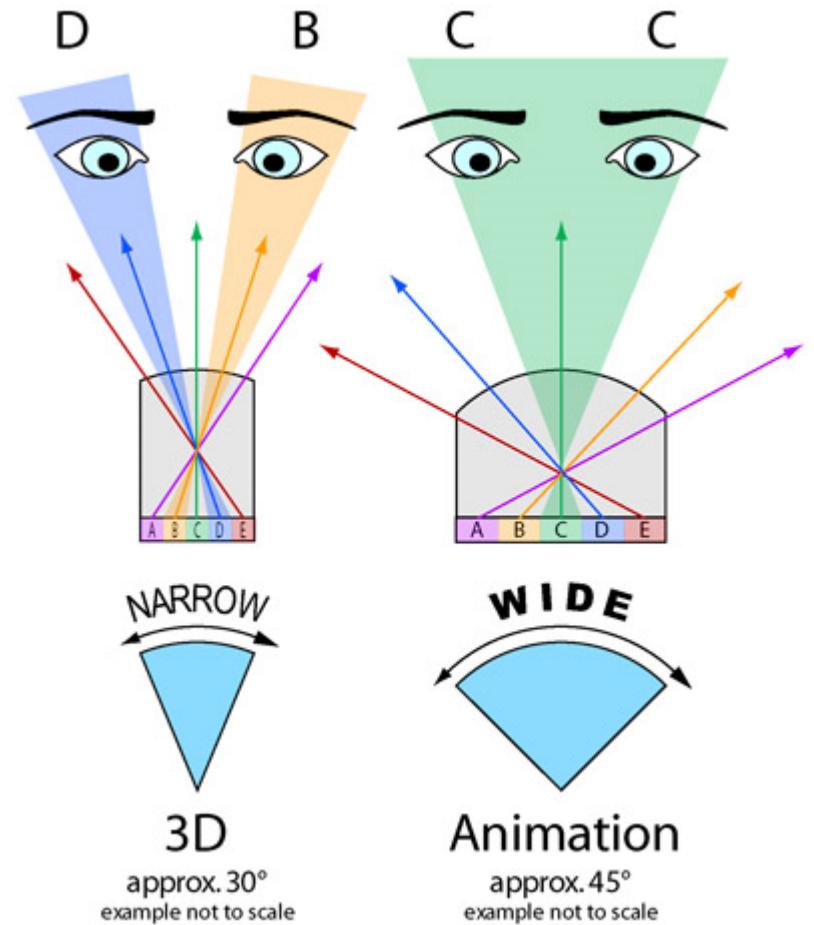






# STEREO ZONDER BRIL

- Te veraf
  - Ogen zien hetzelfde
- Te dichtbij
  - Te veel verschil
- Verkeerde positie
  - Links/rechts omgekeerd
  - Gemixte zones



# STEREO ZONDER BRIL



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Arnhem Nijmegen



# HMD?



# BIJZONDERE GEVALLEN



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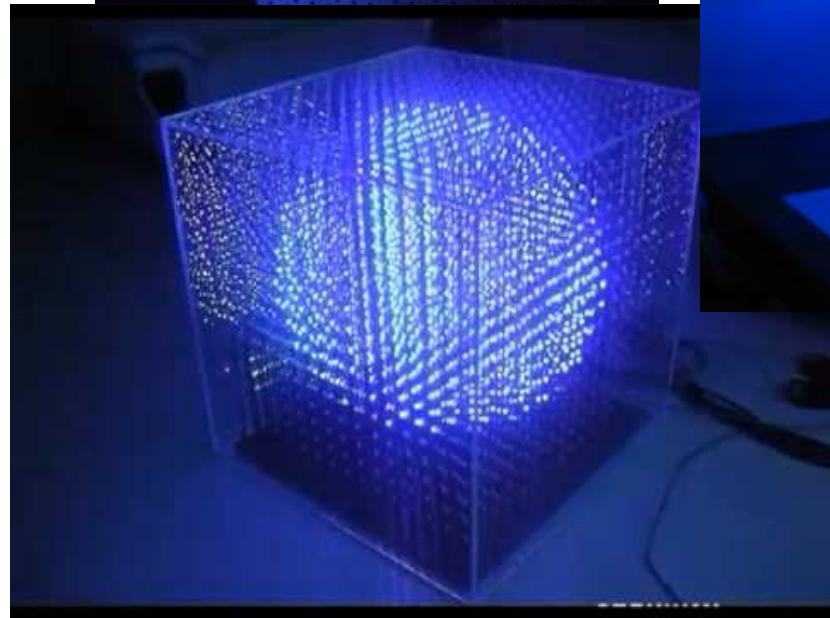
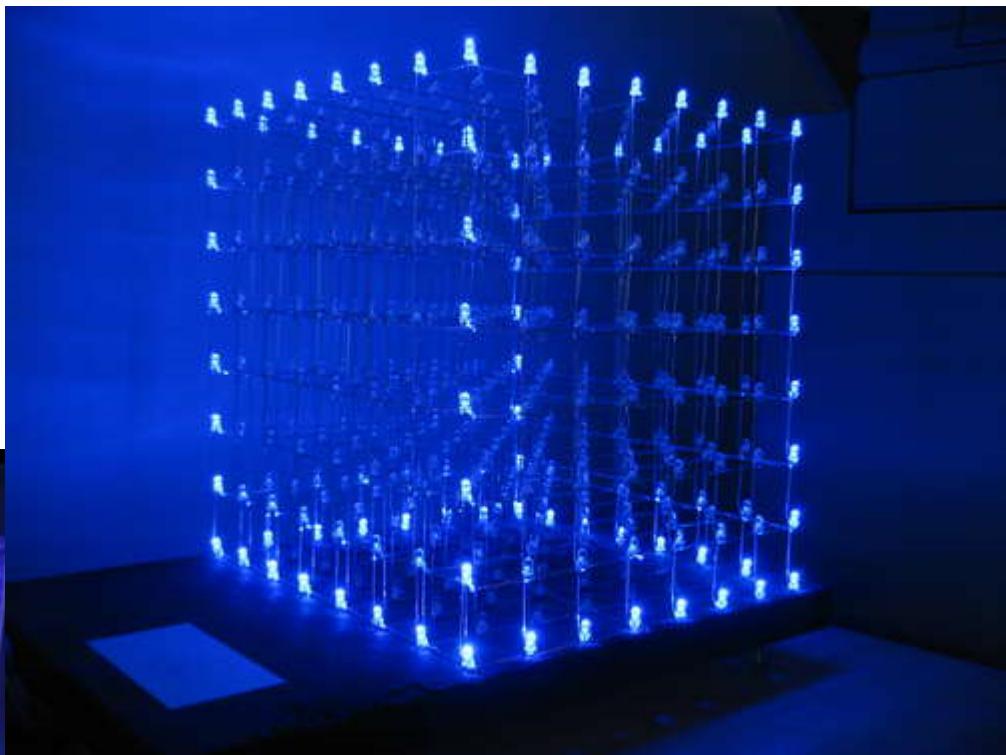
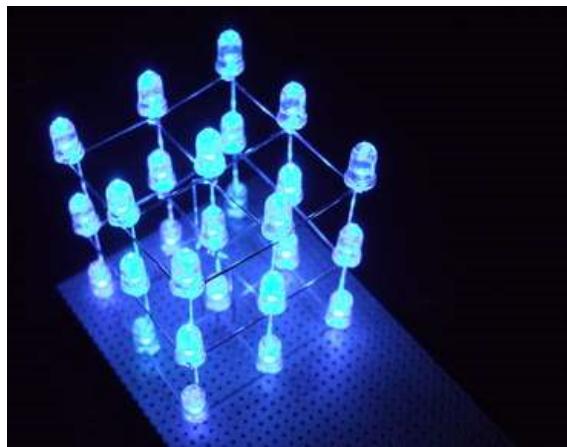
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# GEBOGEN DISPLAY



# LED KUBUS

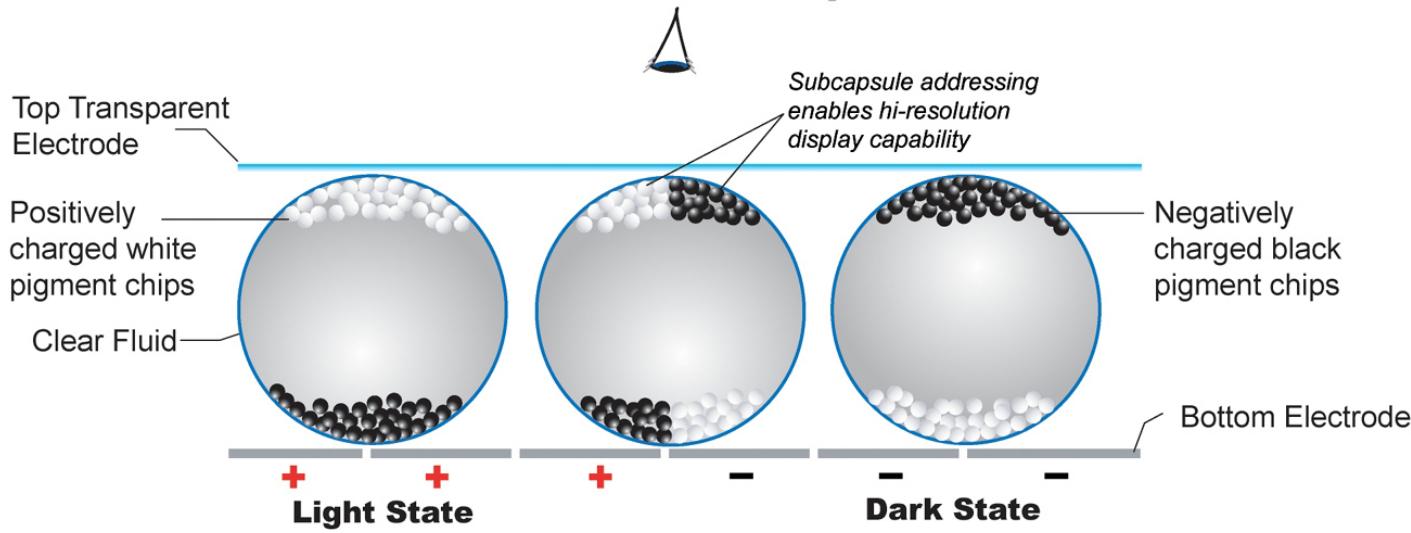


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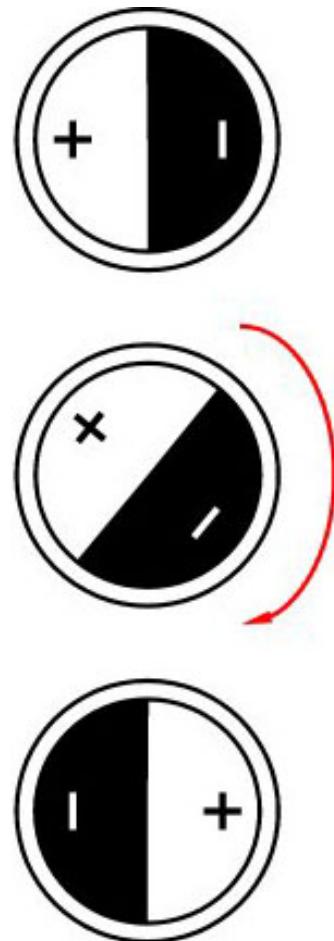
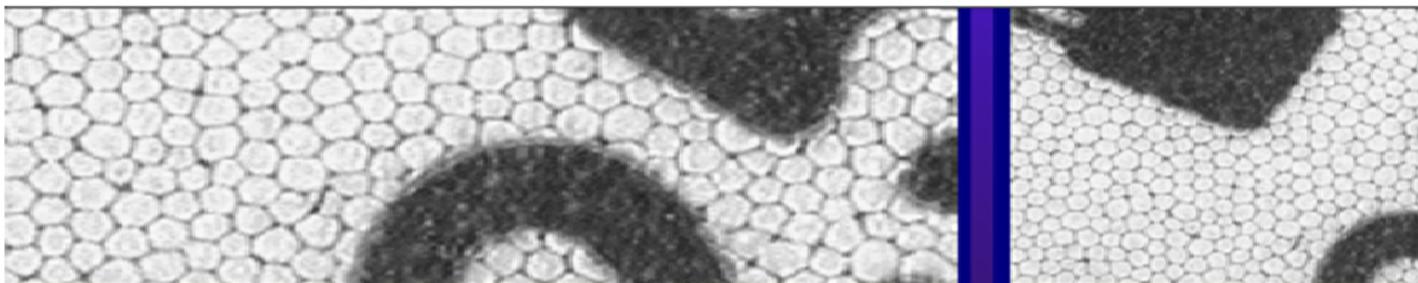


# E-INK

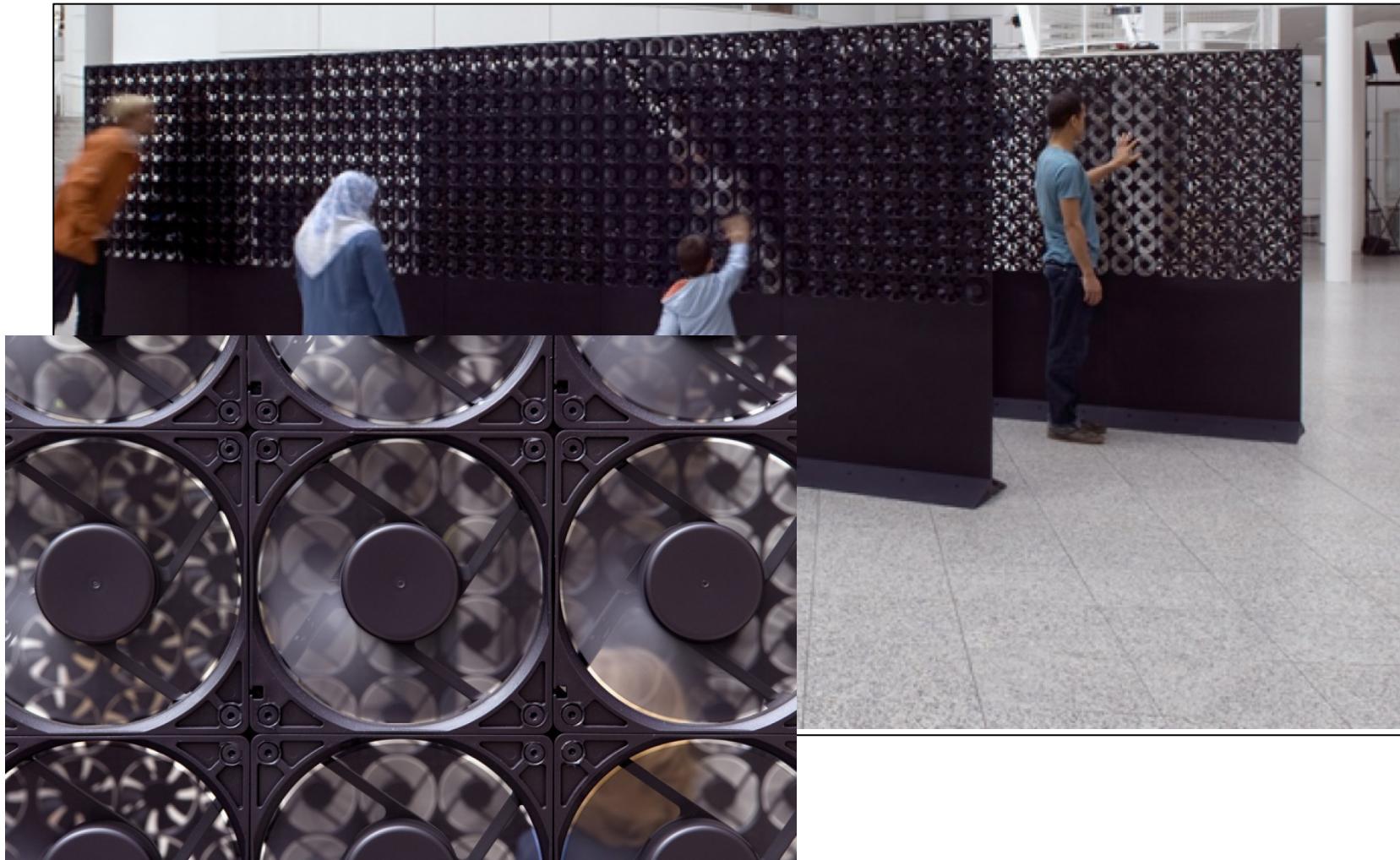
## Cross-Section of Electronic-Ink Microcapsules



*Image not drawn to scale - for illustration purposes only.*



# FLOW 5.0



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# DANIEL ROZIN WEAVE MIRROR



# ARDUINO PRO MINI

Hoe gebruiken we de Arduino pro mini?

