

CSE 190: Virtual Reality Technologies

LECTURE #8: VR DISPLAY ISSUES

Upcoming Deadlines

Sunday, April 25: Project 1 late deadline

Monday, April 26: Discussion Project 2

Sunday, May 2: Project 2 due

Monday, May 3: Discussion Project 3

Sunday, May 9: Project 2 late deadline

App Presentations

Baichuan Wu

- VR Movie "Myth"

Jonathan Barnes

- Echo VR

David Cruz

- Poker Stars VR

VR Display Issues

VR Display Issues: Projectors

Vignetting, caused by hotspot effect

- Brightness falloff
- Viewpoint dependent
- Hotspot at intersection of eye point and projector lens

Polarization falloff

- Viewpoint dependent
- Polarization deteriorates towards more oblique angles



VR Display Issues: Passive LCD

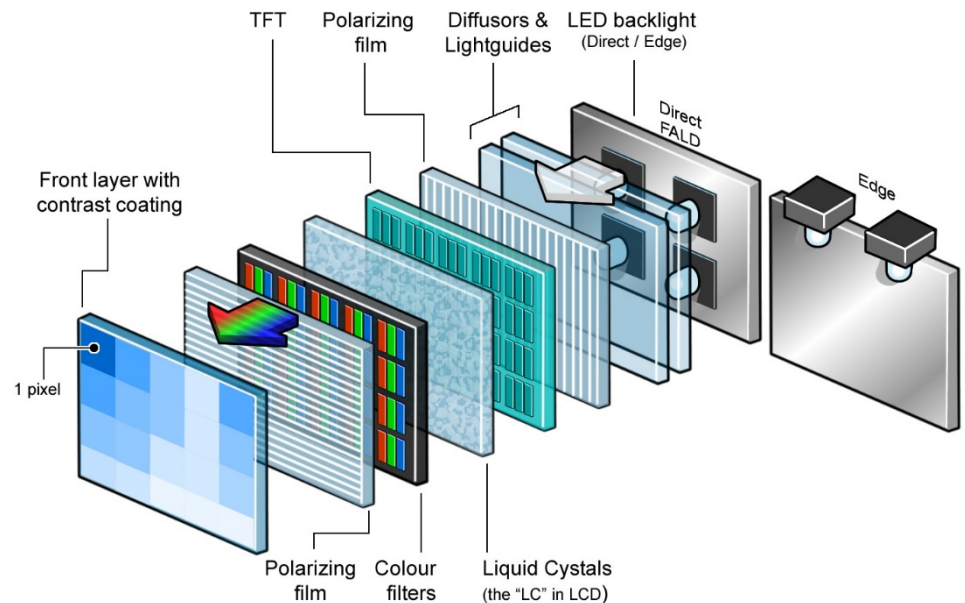
Frame synchronization (simultaneous buffer swaps)

Off-axis viewing along vertical axis causes ghosting

- Caused by distance between pixels and polarization layer (image below does not show polarization layer)

Brightness falloff

Discoloration



VR Display Issues: Passive OLED

Frame synchronization (simultaneous buffer swaps)

Off-axis viewing less bad than with LCDs

- Polarization layer closer to pixels

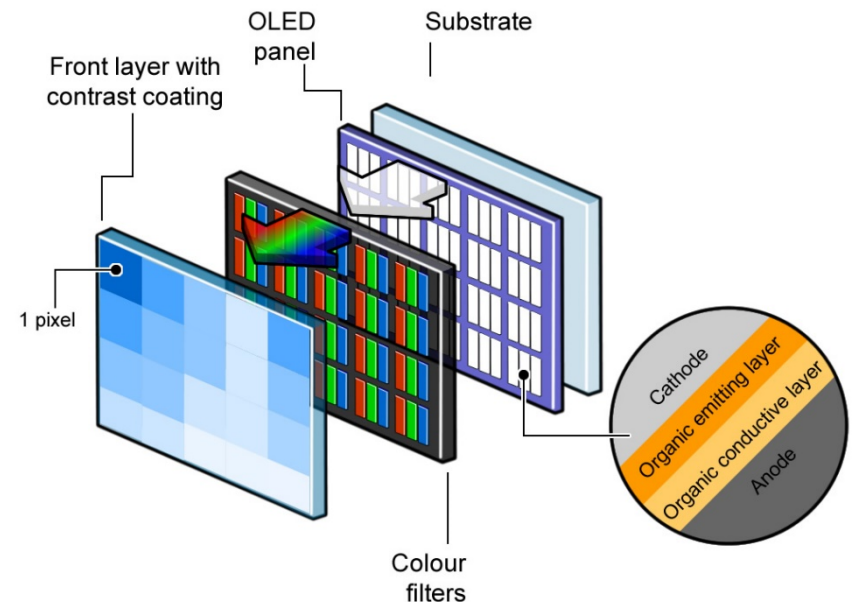
Brightness falloff

Image retention

Burn-in

Automatic Brightness Limiter (ABL)

- Limits overall screen brightness



VR Display Issues: Active Stereo

Synchronization between screens:

- Frame synchronization (simultaneous buffer swaps)
- Image generation (“electron beam”): needs to be in sync between screens and shutter glasses

