

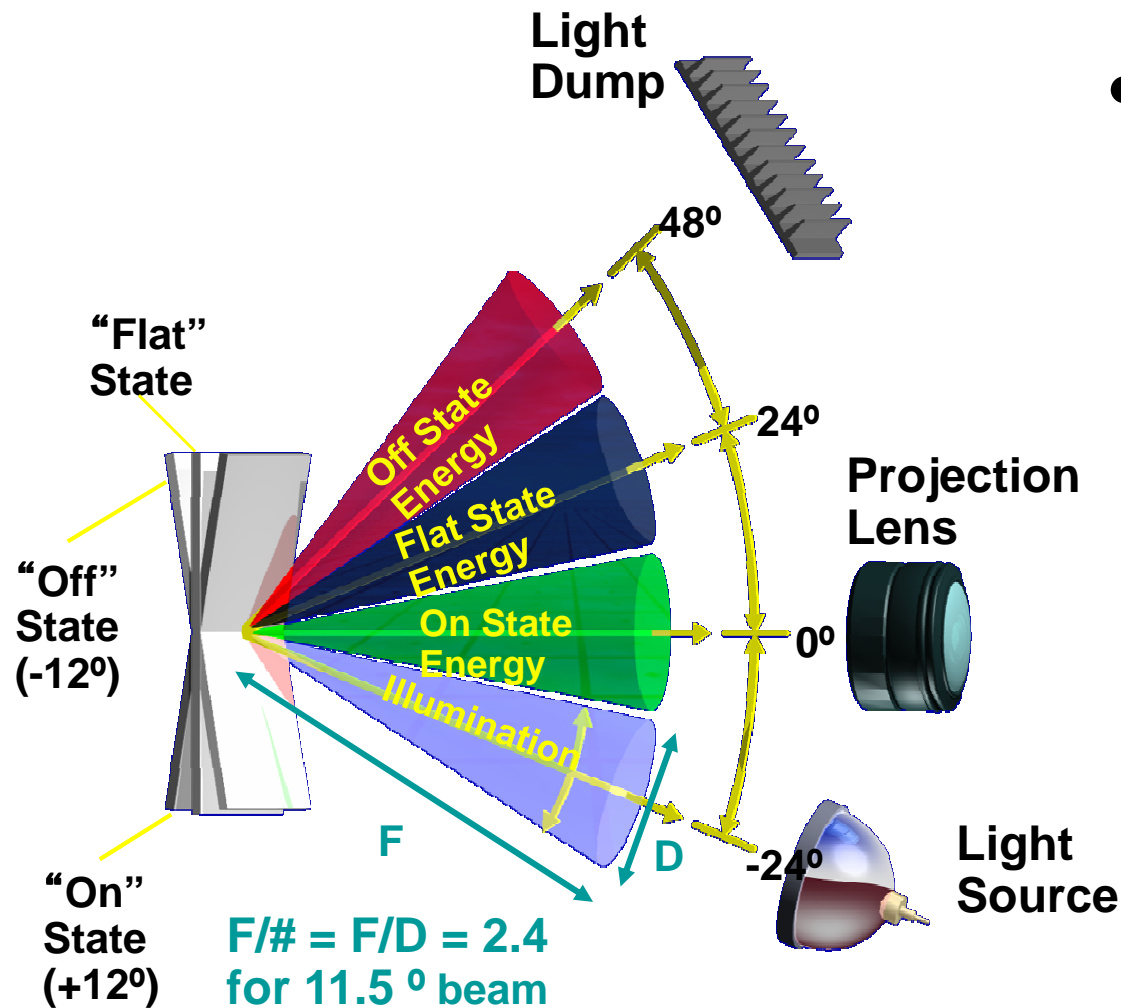
Introduction to DLP Optics

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Ways to use the DMD

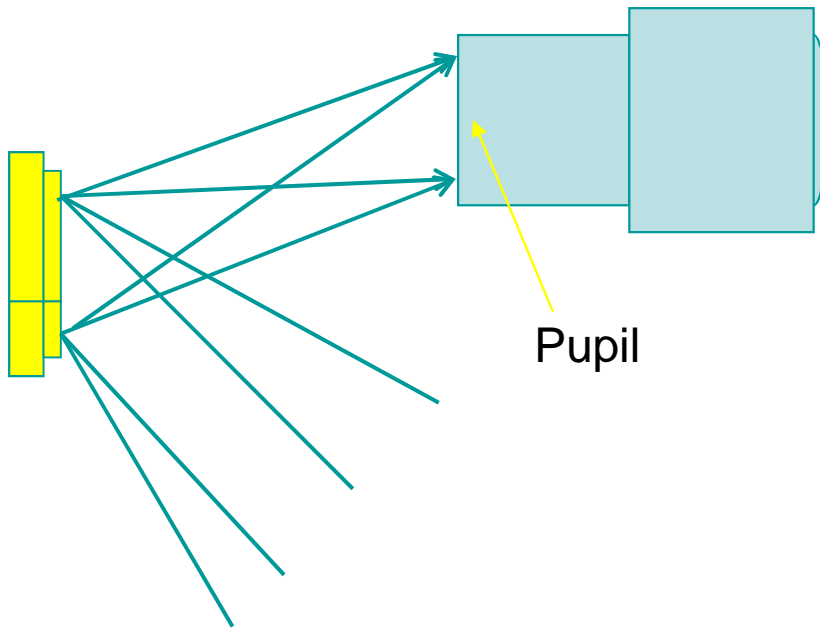
- Object plane – project an image of the DMD surface onto another surface (or a virtual image, e.g. HUD)
- Place at a system stop or Fourier plane – spatial filtering or light modulation (including holographic data storage)
- Place in a diffracted beam – wavelength selection/spectroscopy

How the Light Is Steered

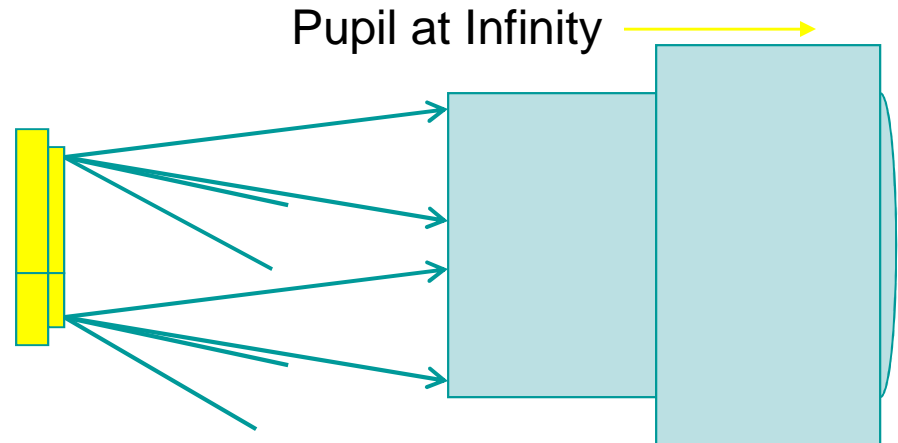


- +/- 12° tilt angle on mirrors permits 4 nonoverlapping cones of light at f/2.4

What Does Telecentric Mean?

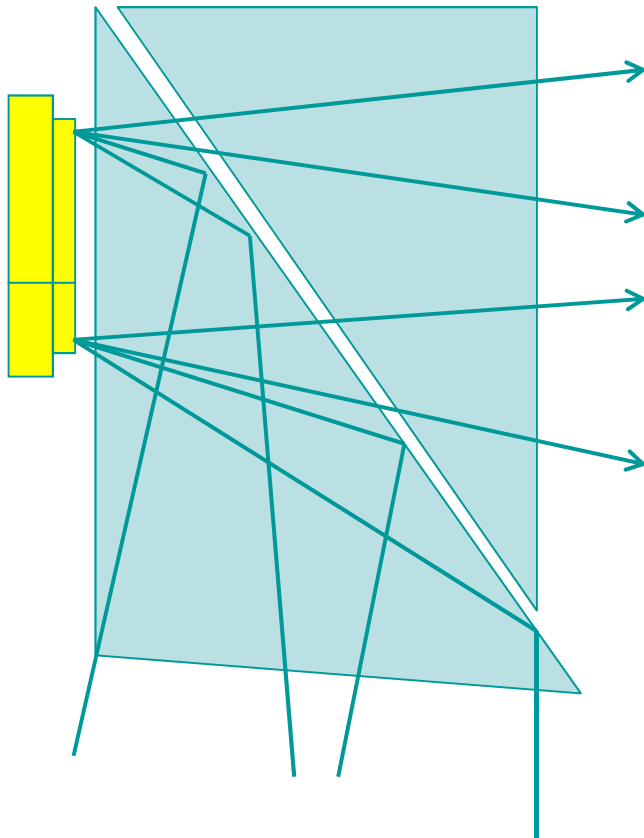


- Non-Telecentric: Projection pupil near entrance of projection lens
- Generally requires offset illumination



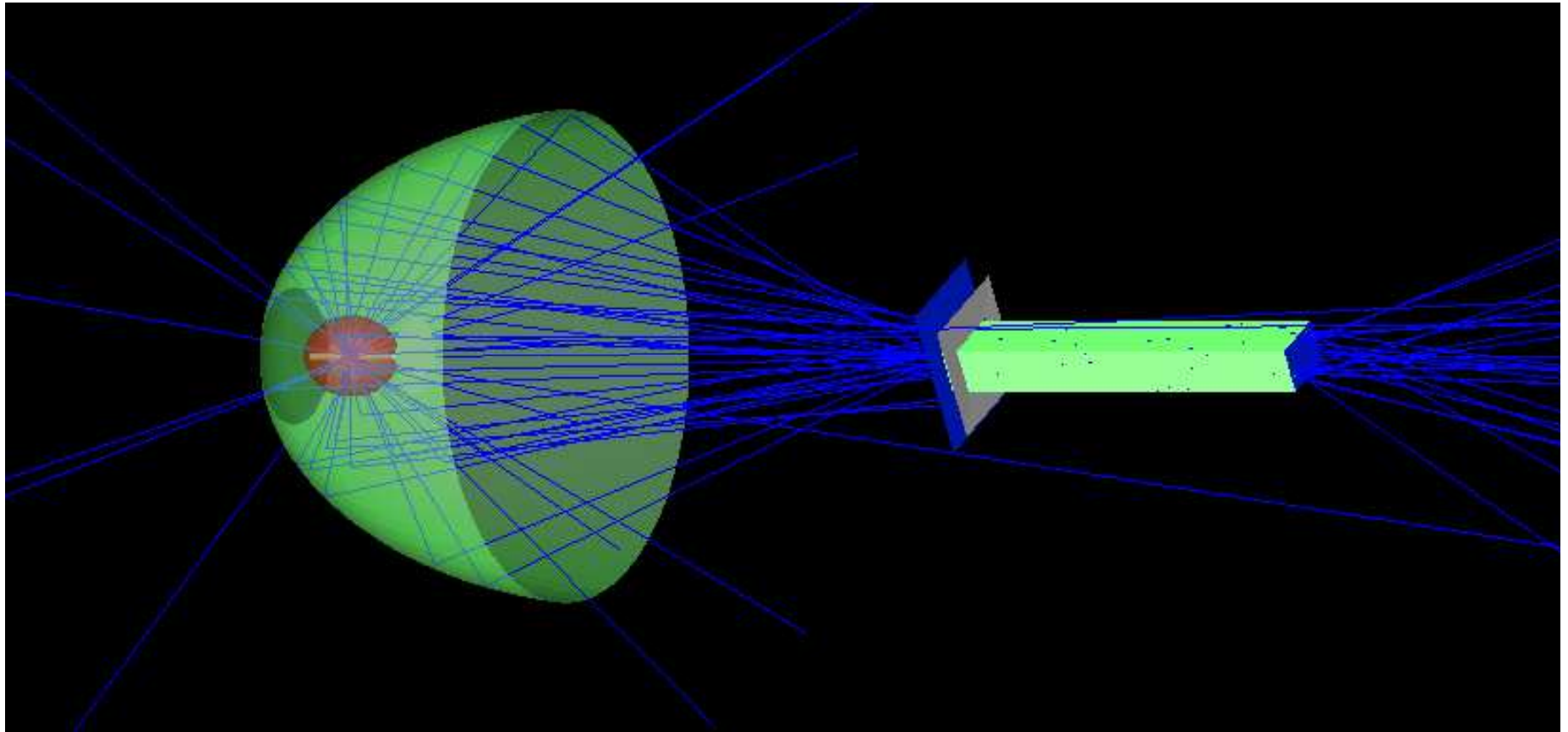
- Telecentric: Projection and/or Illumination pupils at infinity
- Each pixel “sees” rays from the same $f/\#$ and direction
- Better uniformity in on and off states
- Can be more compact
- Larger projection lens
- Requires TIR prism

TIR Prism

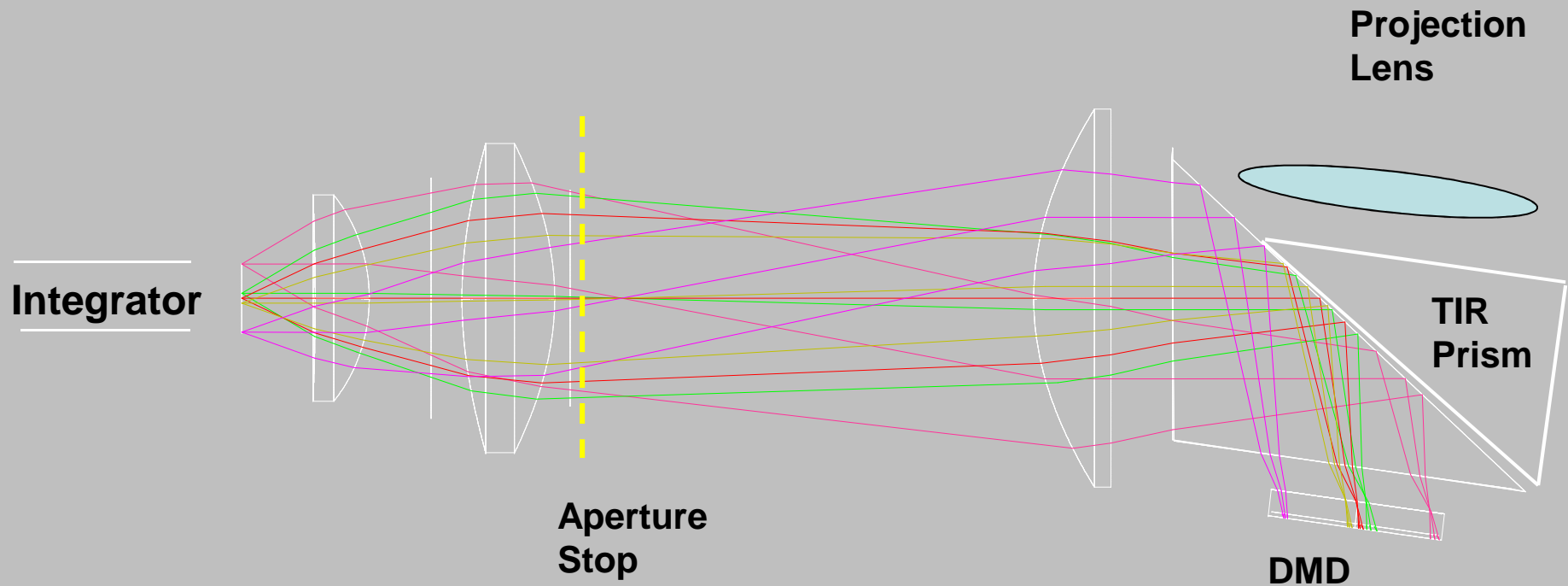


- TIR Prism discriminates between incoming and outgoing rays based on angle
- All rays less than critical angle (approx. 41.2 degrees in BK7) will pass; rest will reflect
- Air gap is made small (approx. 10 um) to reduce astigmatism in projected image

Lamp and Integrator



Illumination Relay Optics



To obtain maximum uniformity of illumination at the DMD, the relay optics should be telecentric in both object and image space, with no vignetting.