OSIRIS Multi-Object Spectroscopy

MOS Slit corrections

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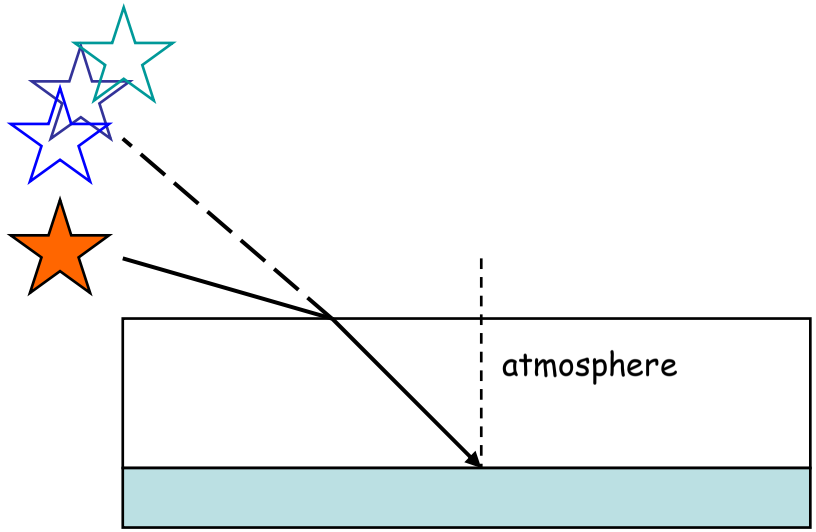
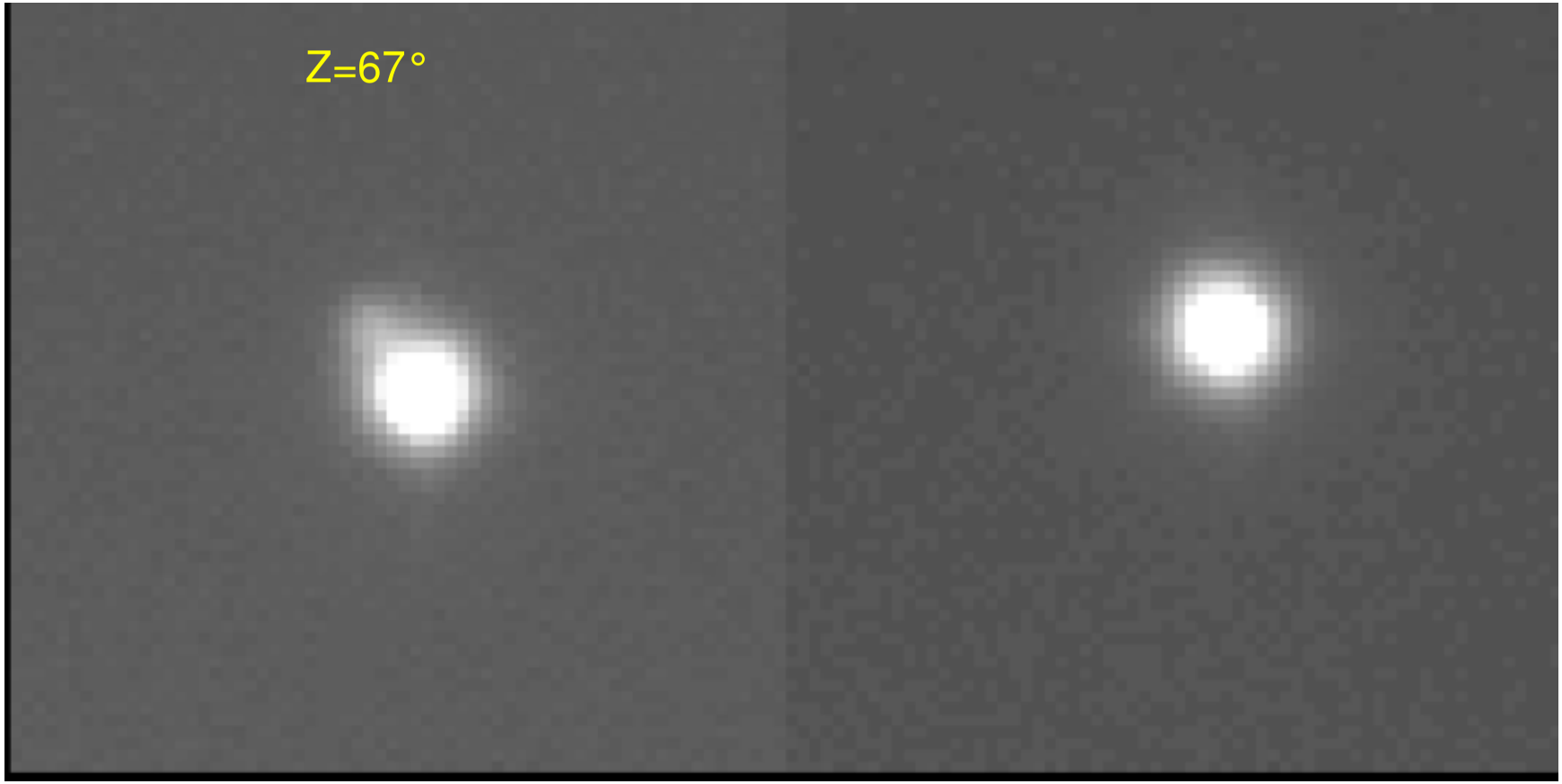
Atmospheric refraction

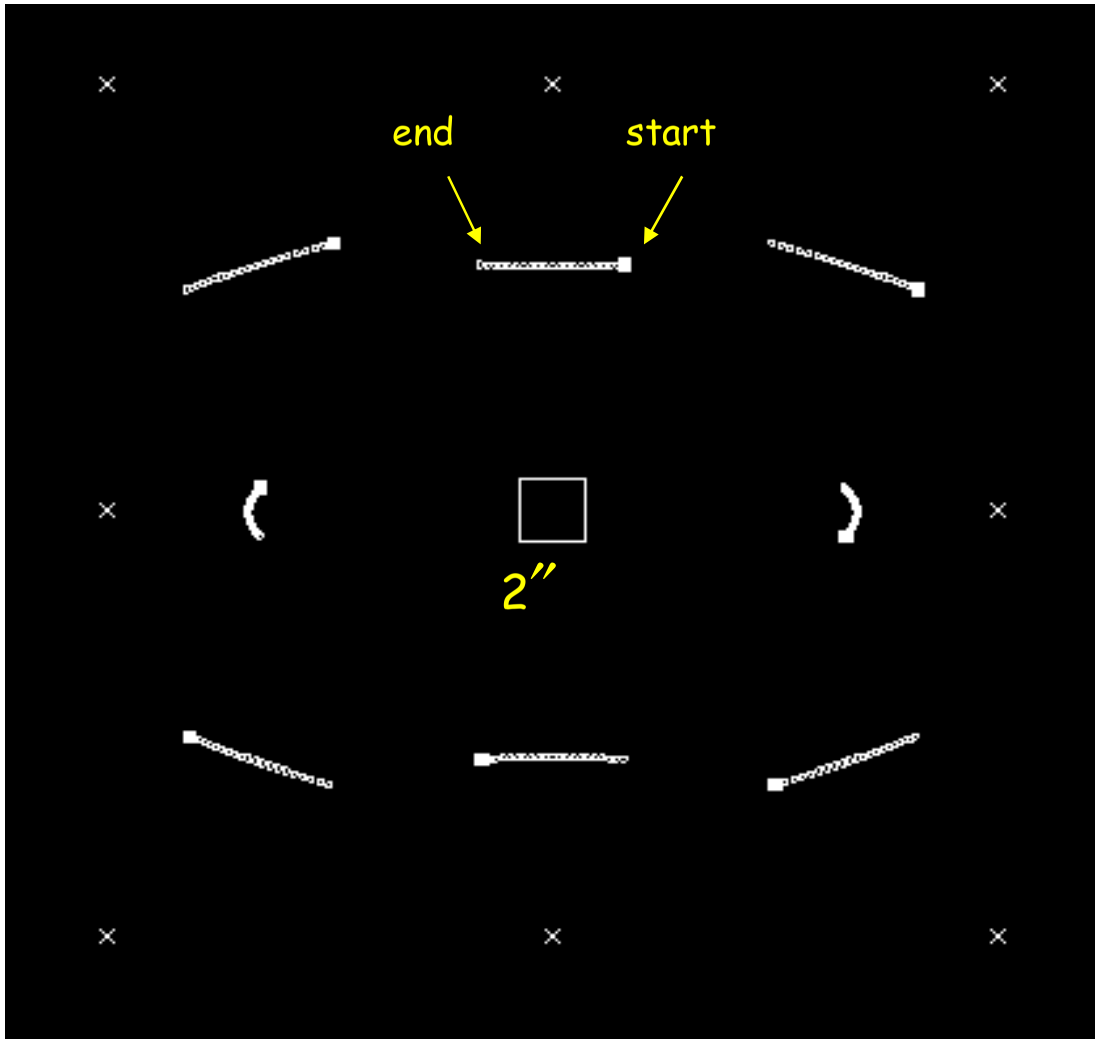
- Parallel-plane model of atmosphere gives error in apparent position of object ("refraction"). Moreover, this effect is wavelength –dependent
- For instance, even at a modest sec(z)=1.5, an image at 4000Å is displaced towards the zenith by 1.1 arcsec relative to the image at 6000Å. If you are trying to observe over this wavelength range using a 2 arcsec slit, you will suffer large amount of light-loss unless you place the slit at the parallactic angle (i.e. normal to horizon)



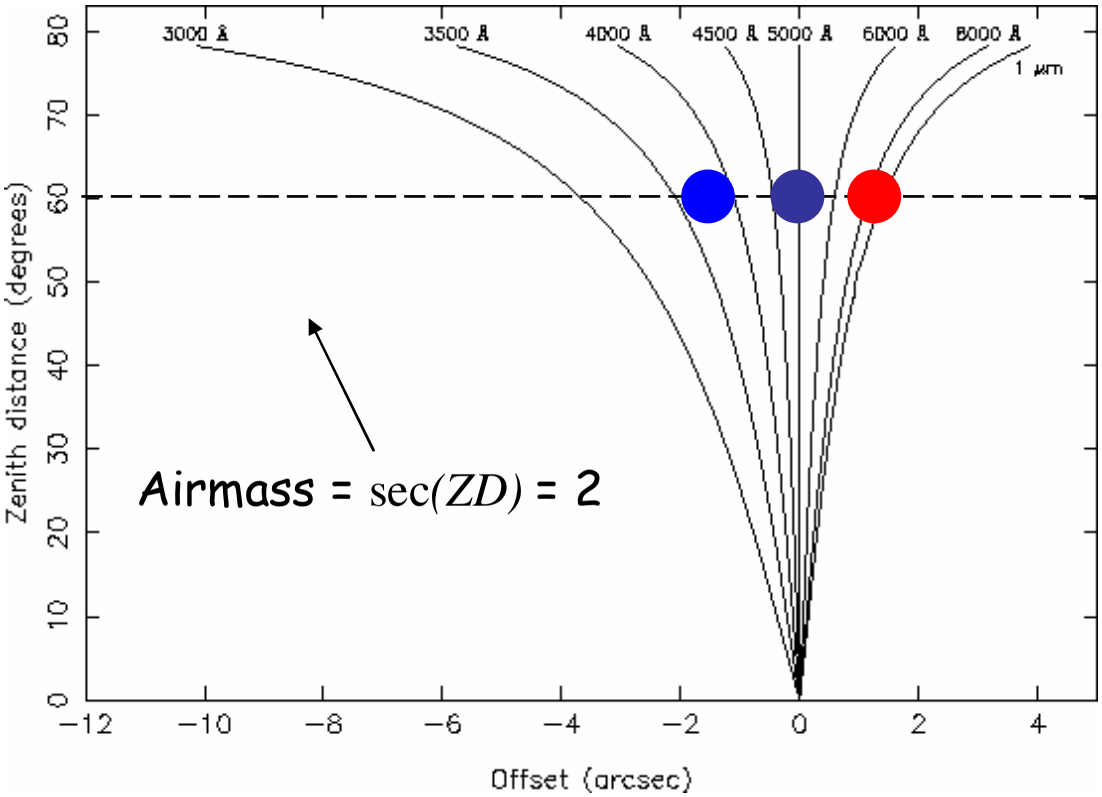


Lewis et al. 2002

- Motion of images at edges of a 2°x2° field compared with 2″ aperture for (±1 HA) at dec = 50°

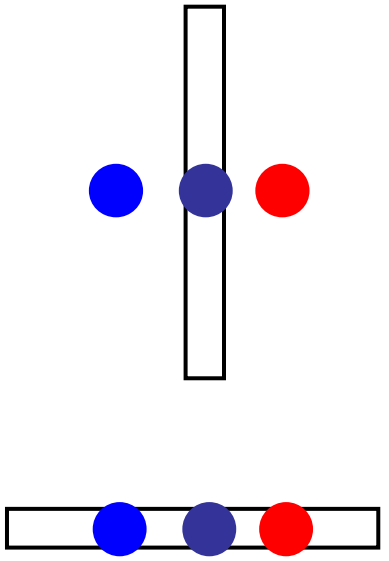


Atmospheric dispersion



To zenith

If slit is horizontal, light is lost at extreme wavelength

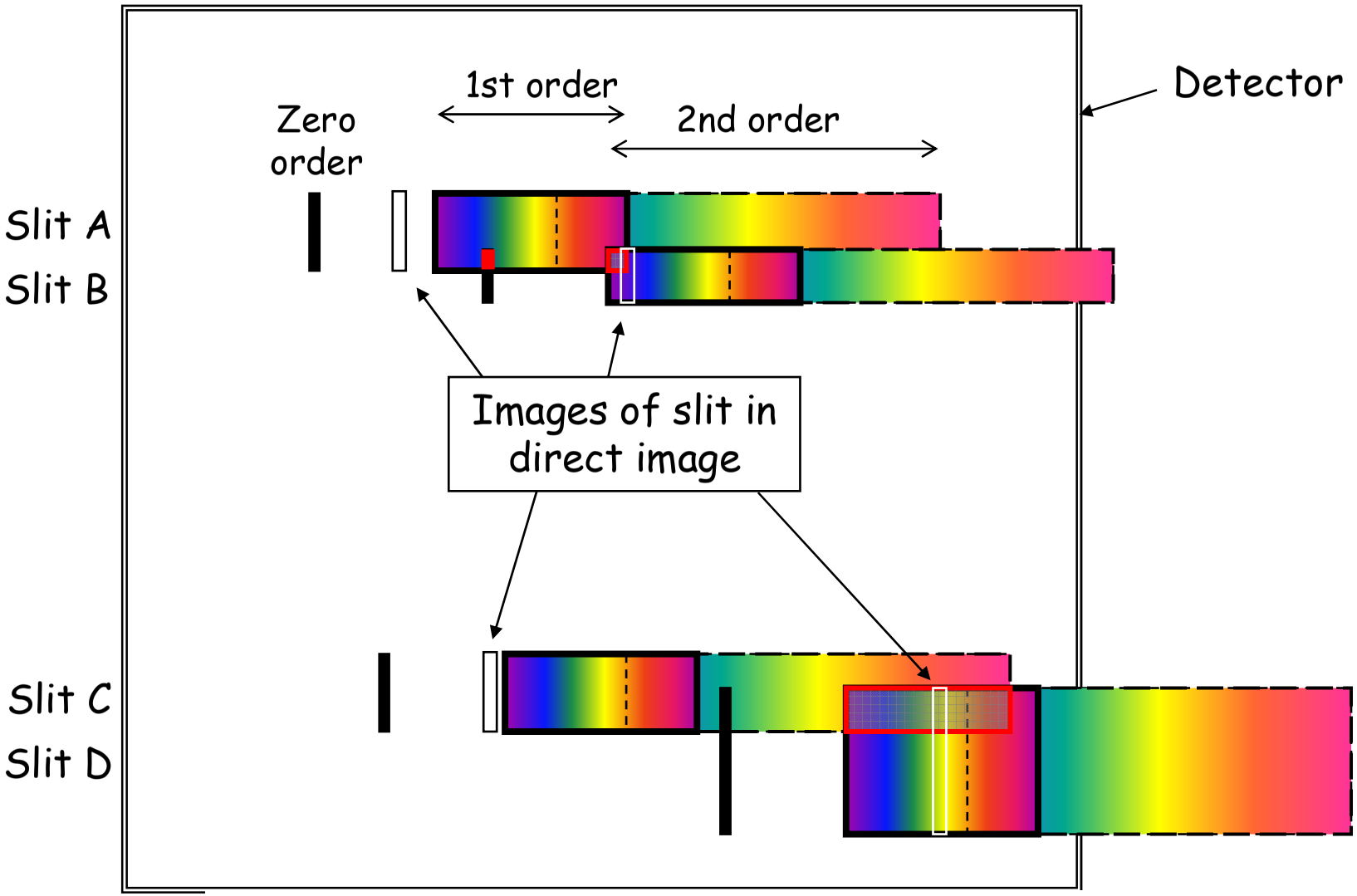


If slit is vertical, all light is in slit, but spectrum will be curved

Error in position if guiding at 500nm

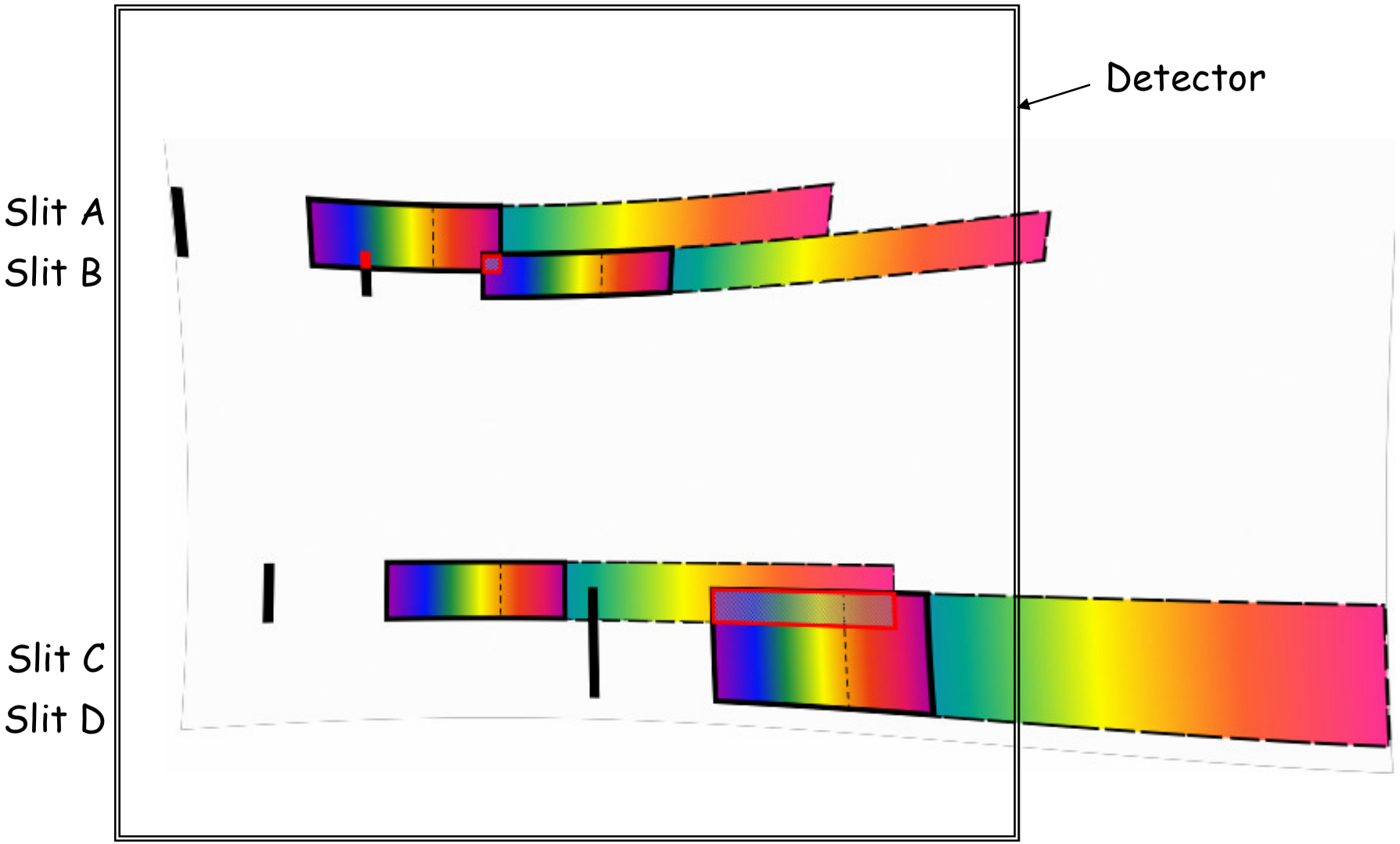
- Recommendations
  - If possible observe near transit
  - Align the slits normal to horizon (parallactic angle)
  - Limit length of observation to reduce airmass range
  - Use a different mask for each range of airmass, with slit positions allowing for refraction → the mask designing software has to cope with that!

Effect of anamorphism



- Extraction software must take anamorphism into account
- No effect on transformation between mask and *direct image*

Effect of distortion



- Lines of constant wavelength curved → "2D scrunch"
- Lines of constant position along slit curved → "trace"