Impacts of no ADC in GMOS

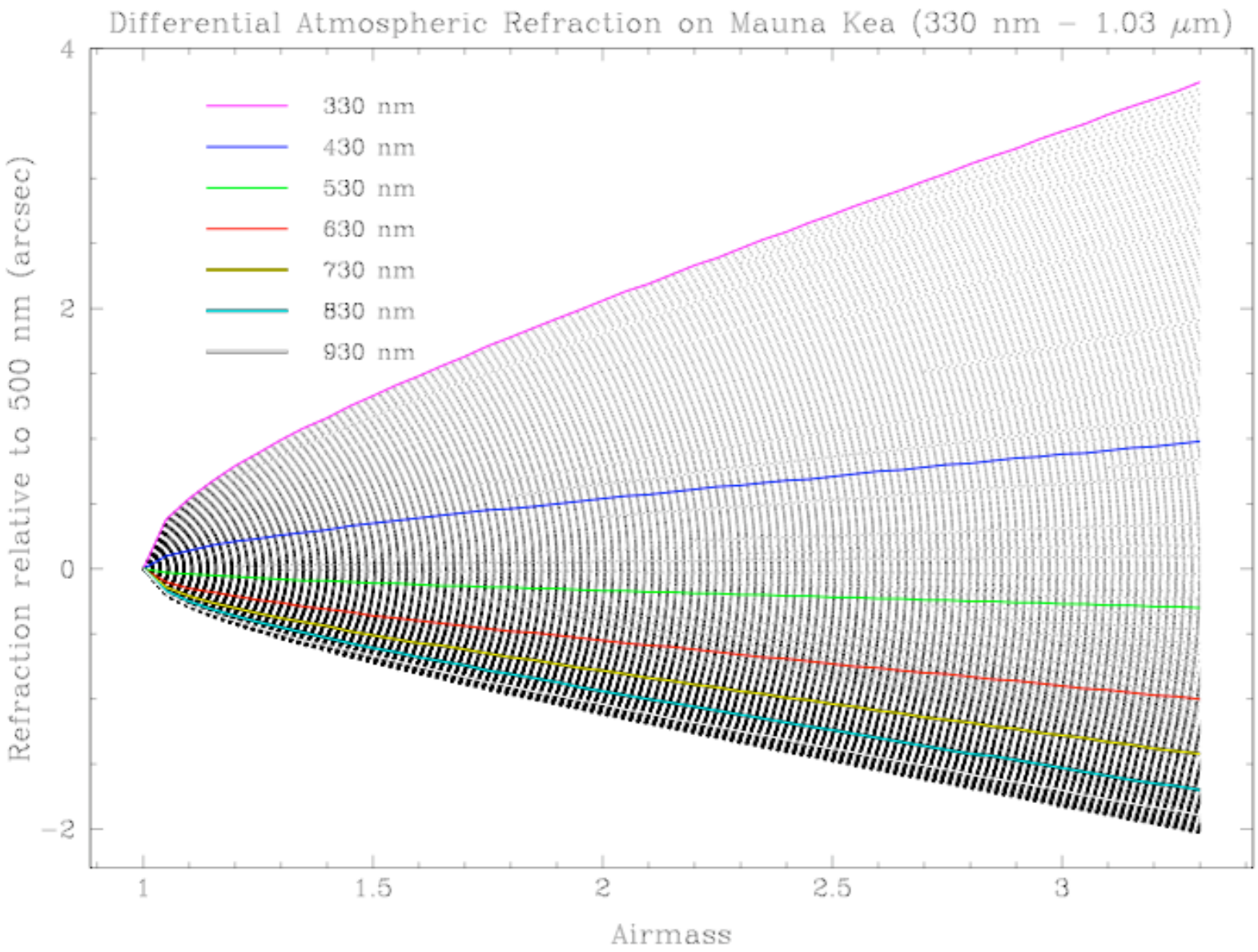
What we can do to minimize the effect on imaging and spectroscopy?

This is to raise awareness among the science staff (including observers, contact scientists, queue coordinators and NGOs) about the implications on blue imaging and (especially) spectral data taken in the absence of an ADC on either GMOS

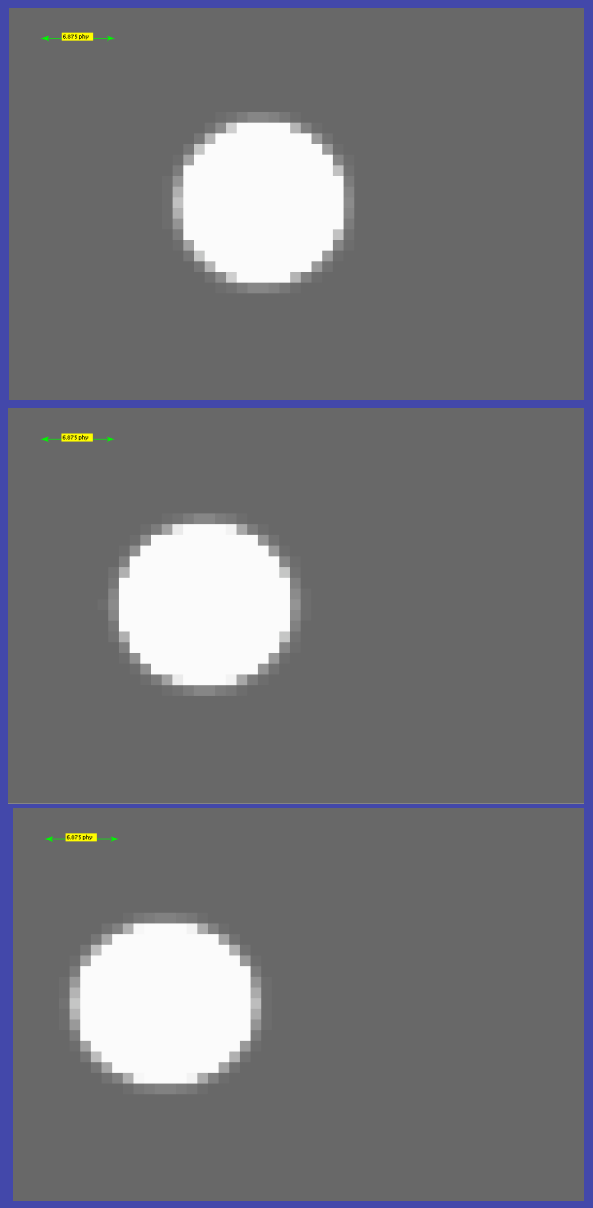
Neither GMOS has ever had an ADC and this is not appreciated enough among the Gemini user community. Staff have not been given adequate guidance to help PIs deal with this and compromised data has been delivered

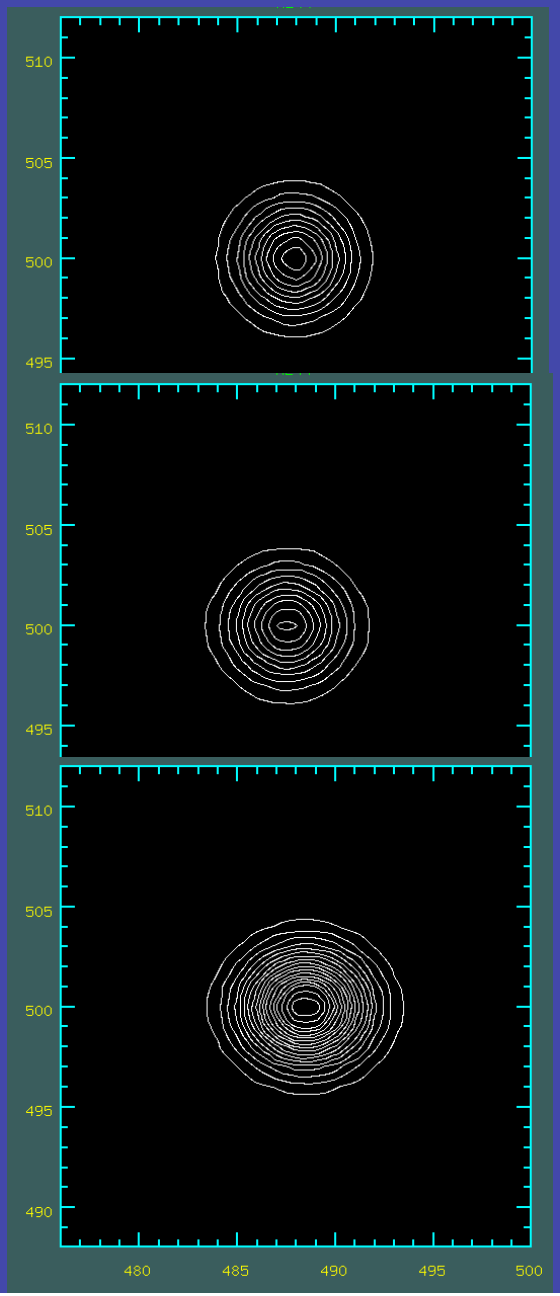
This is NOT a discussion as to whether or not either GMOS should eventually have an ADC. This is a discussion for how we deal with the current configuration (better than we have been)

- What GMOS configurations are potentially impacted
- How are blue imaging and blue spectral data affected (with examples)
- How do contact scientists identify when data will be adversely affected
- What observing strategies can mitigate the effect; what advise should NGOs and CSs be giving to PIs
- What amount of scheduling constraints (how tight) will the QCs allow without reducing the programs chances at being observed and how does this correlate with ranking band
- What OT enhancements can we implement (will we implement) to make the third and fourth items easier
- What can PIs do after the fact to "correct" their data, are there tools available
- Public Webpages will have to be amended to include as much of this information as possible


Differential Atmospheric Refraction on Mauna Kea (330 nm – 1.03 μm)
330 nm
430 nm
530 nm
630 nm
730 nm
830 nm
930 nm
Refraction relative to 500 nm (arcsec)
4
2
0
−2
1
1.5
2
2.5
3
Airmass

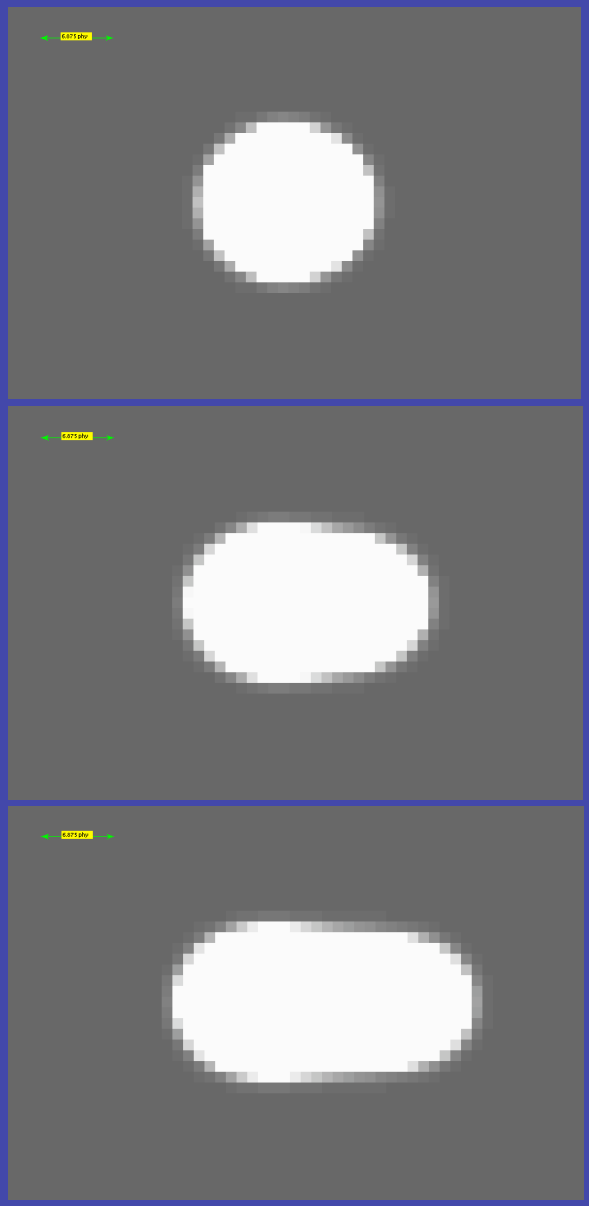
Imaging - Mauna Kea (models)

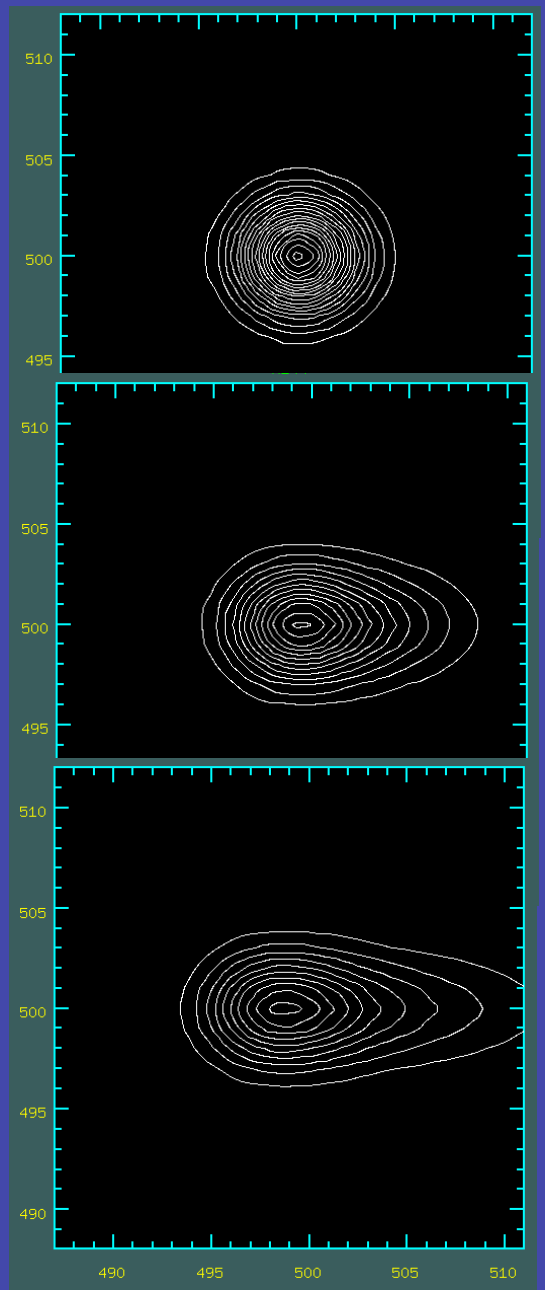




- Models include only differential refraction with airmass
- All refraction is relative to 500 nm
- Assumes seeing disk is 0.3" with no refraction
- No appreciable elongation for i-band at most airmasses, only displacement
- Airmass 1.05, 1.5, 2.0
- i-band filter wavelength range 706-850 nm

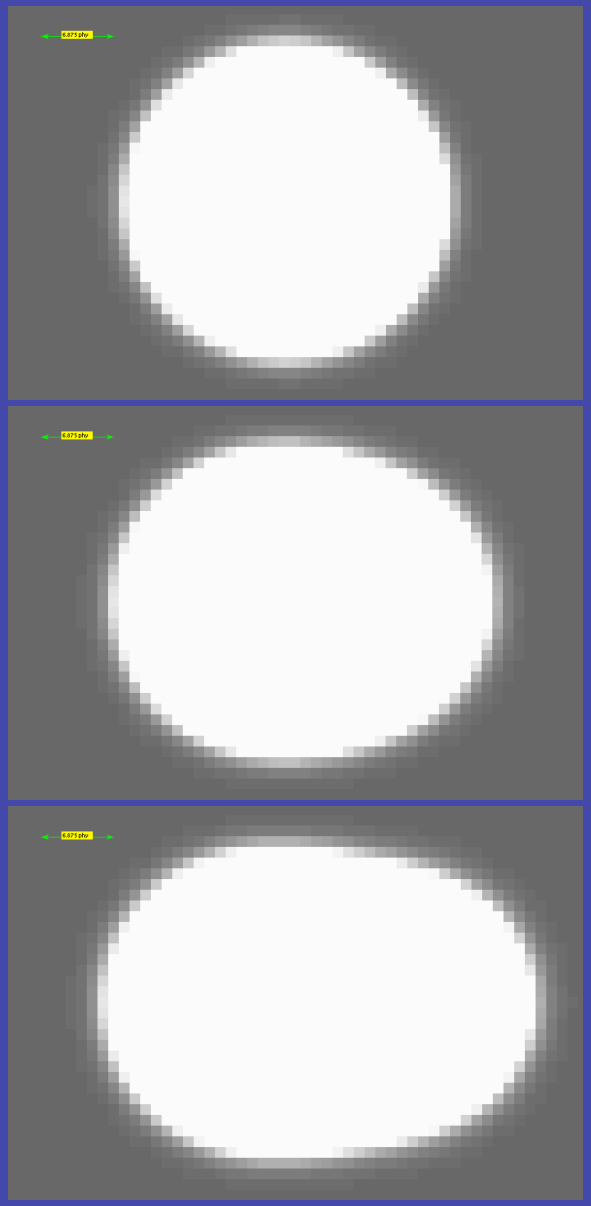
Imaging - Mauna Kea (models) - cont.

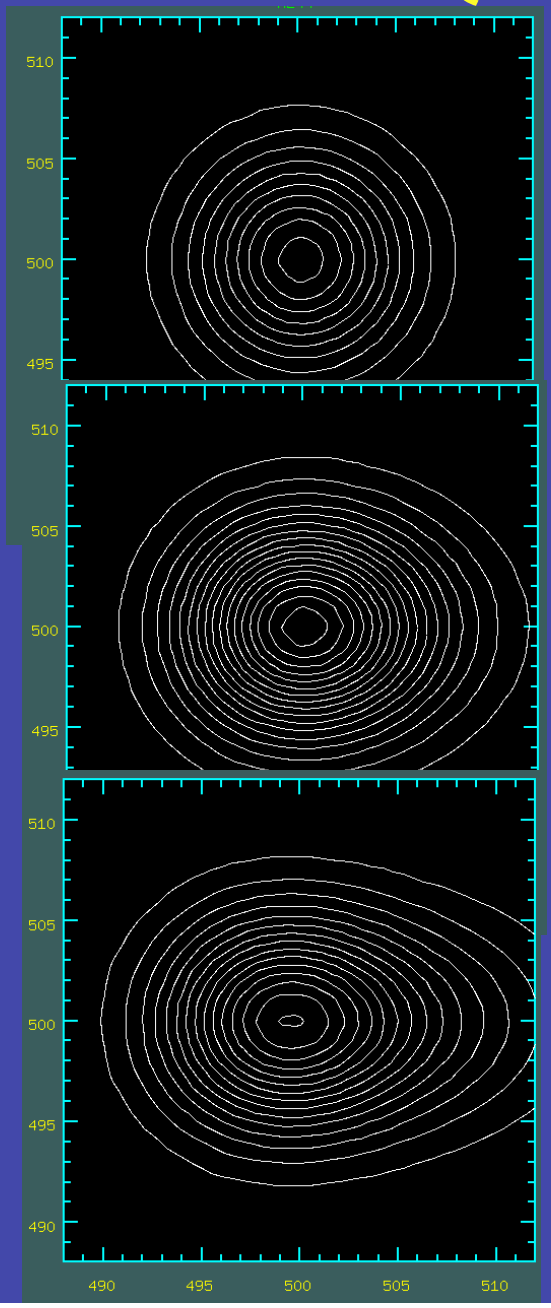




- Models include only differential refraction with airmass
- All refraction is relative to 500 nm
- Assumes intrinsic image quality is 0.3"
- Appreciable elongation at even low airmass in g-band
- u-band not modeled but would be even more severe
- Airmass 1.05, 1.5, 2.0
- g-band filter wavelength range 398-552 nm

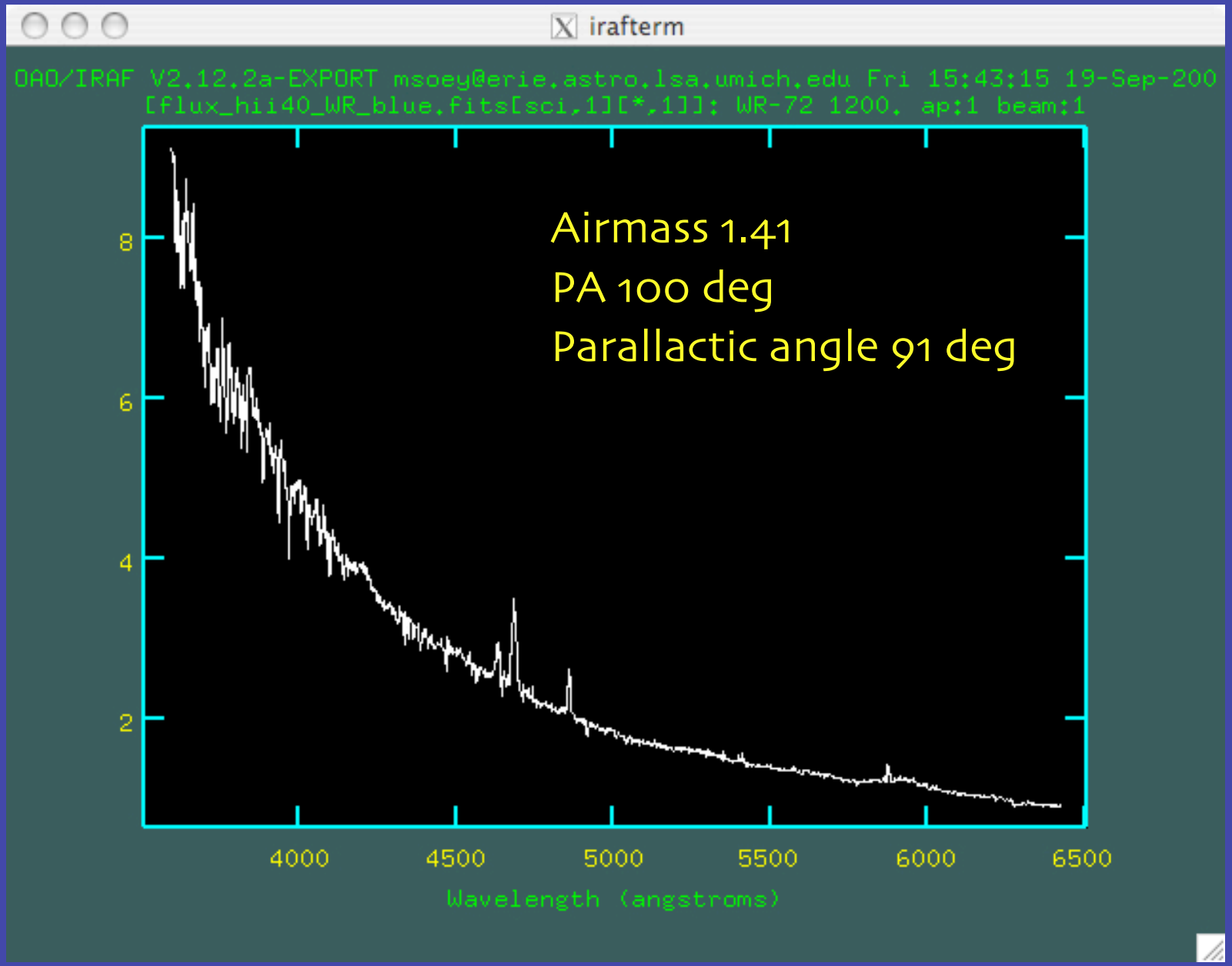
Imaging - Mauna Kea (models) - cont.



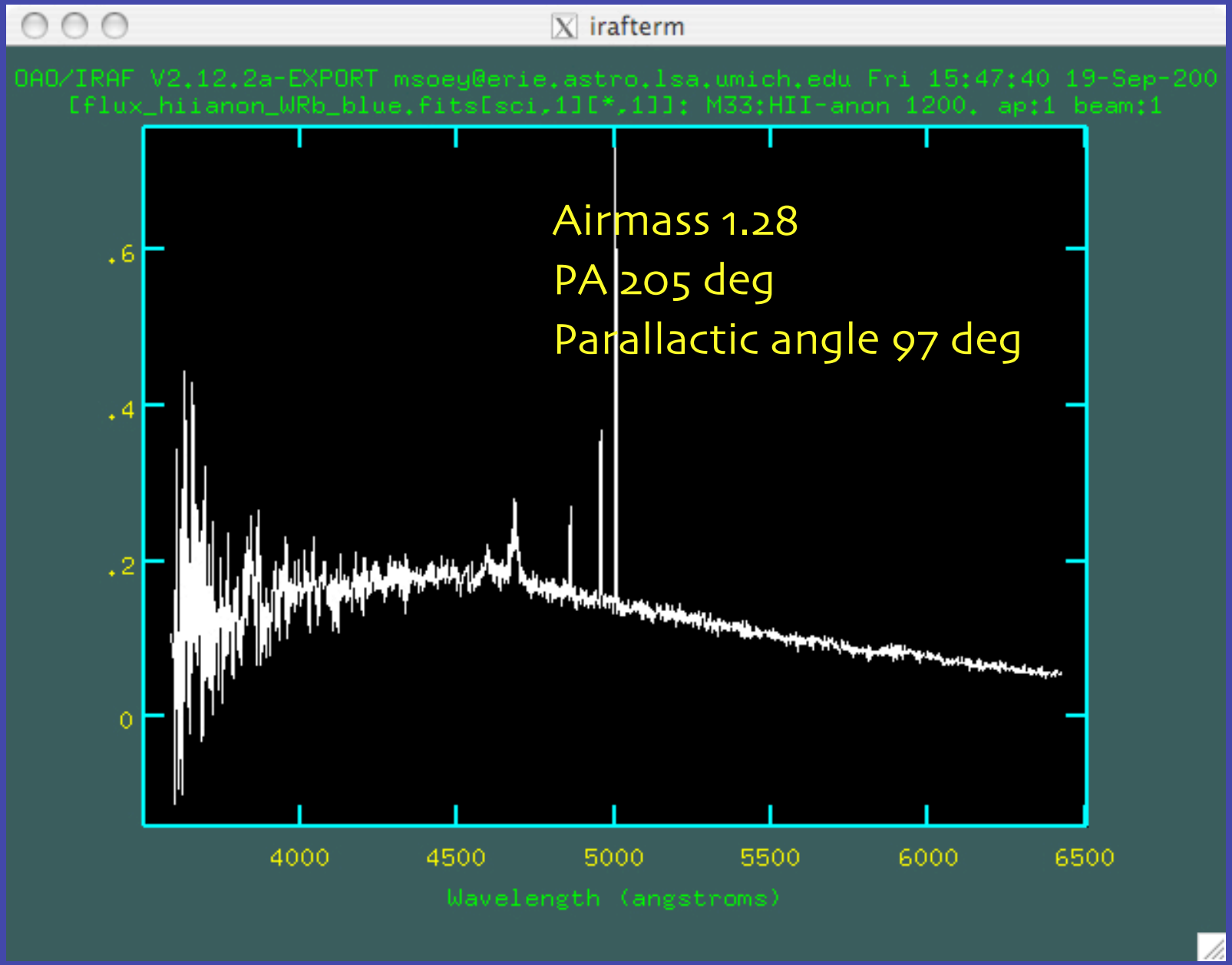


- Models include only differential refraction with airmass
- All refraction is relative to 500 nm
- Assumes intrinsic image quality is 0.6”
- Elongation only becomes a problem at fairly high airmass
- u-band not modeled but would be even more severe
- Airmass 1.05, 1.5, 2.0
- g-band filter wavelength range 398-552 nm

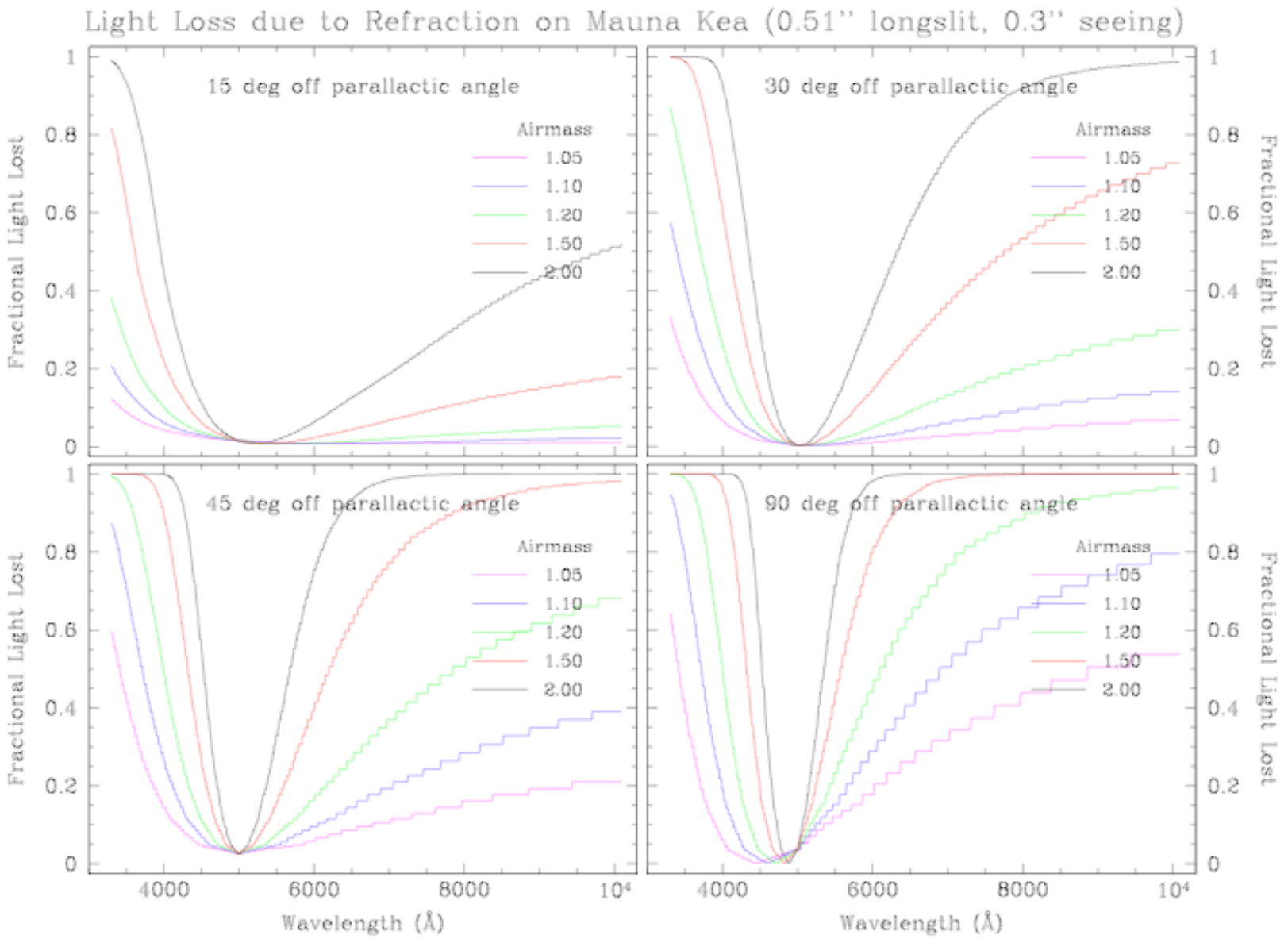
Spectroscopy - Mauna Kea (data)



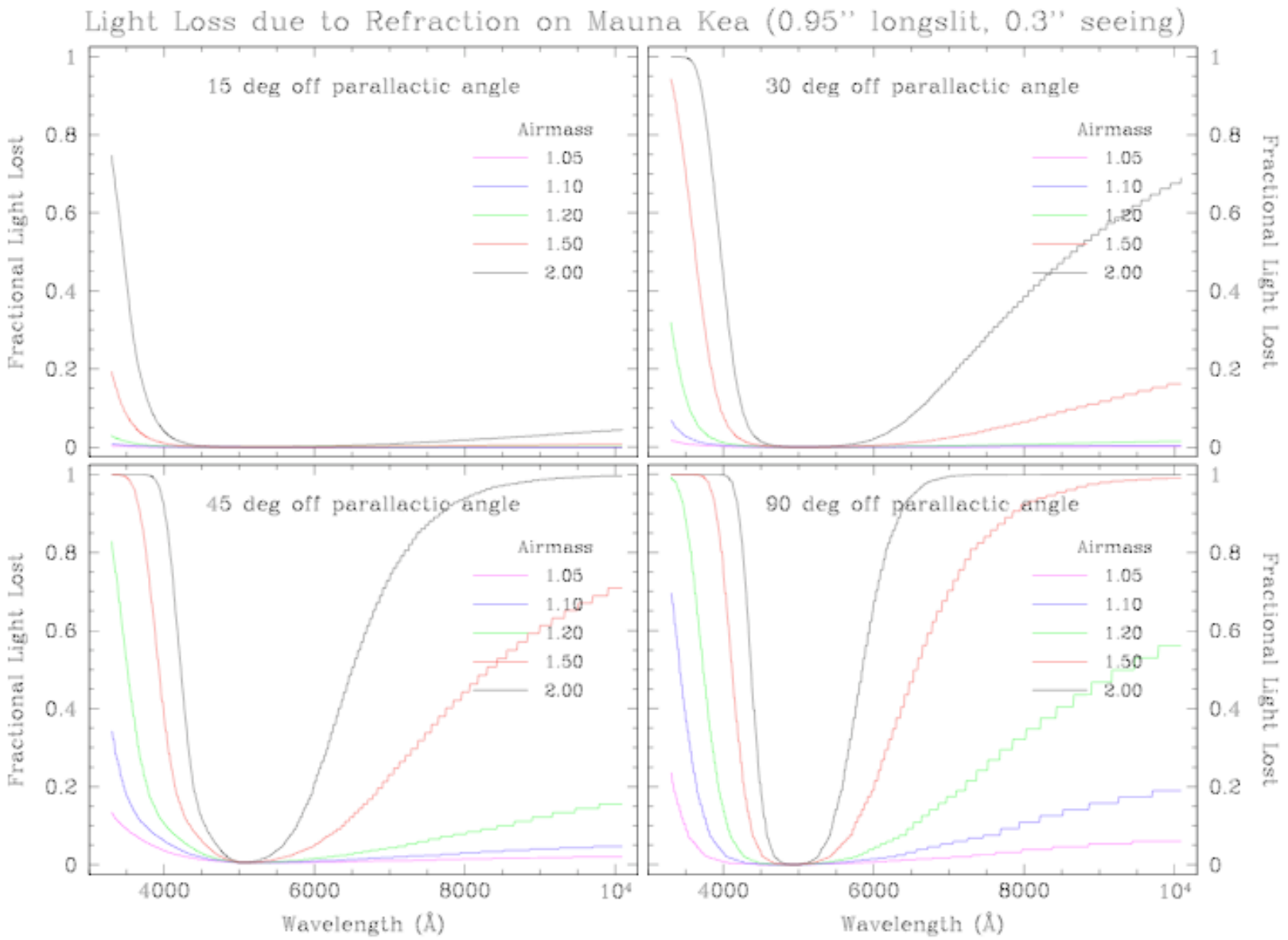
Spectroscopy - Mauna Kea (data)



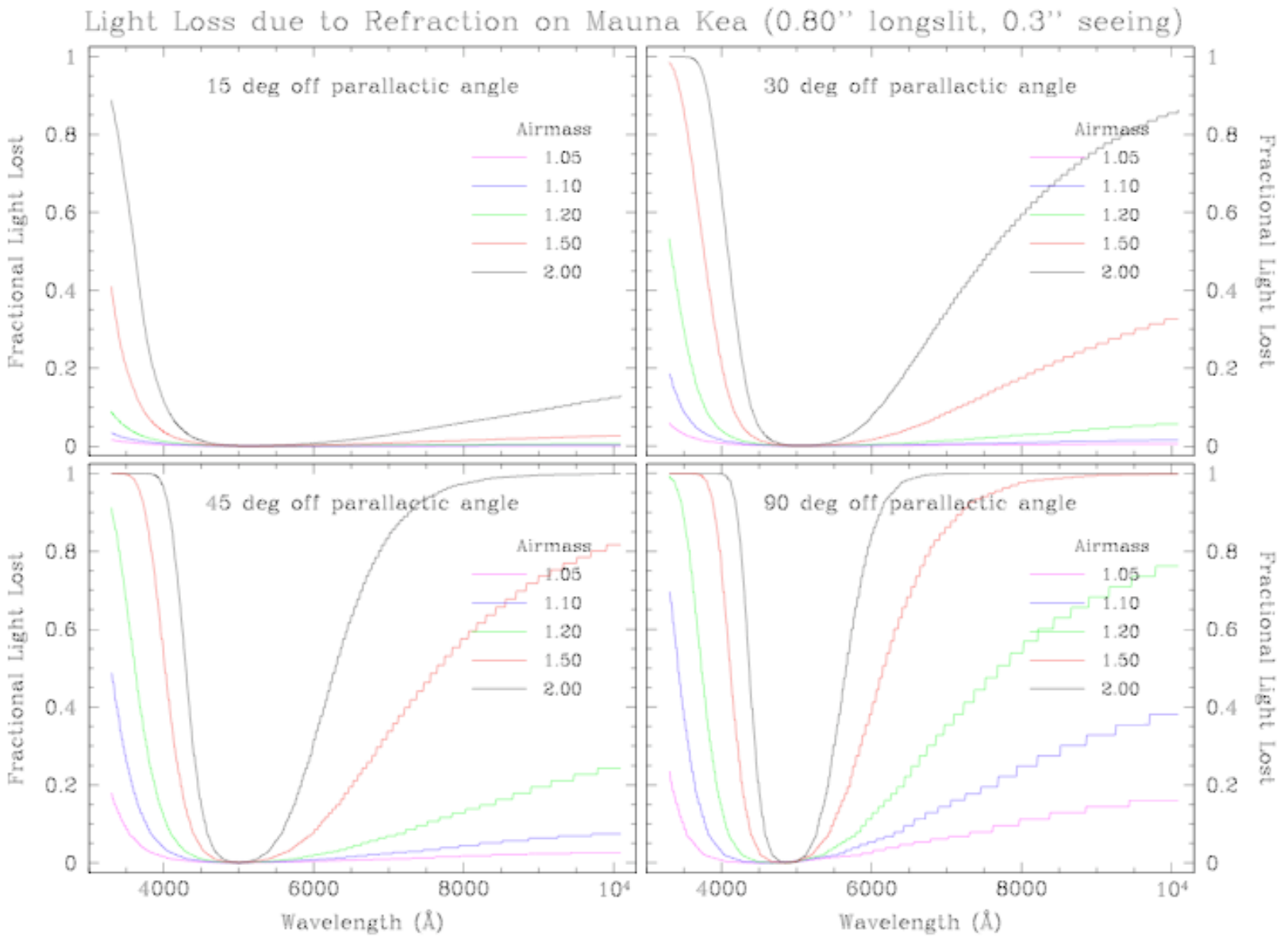
Spectroscopy - Mauna Kea (models)



Spectroscopy - Mauna Kea (models)



Spectroscopy - Mauna Kea (models)



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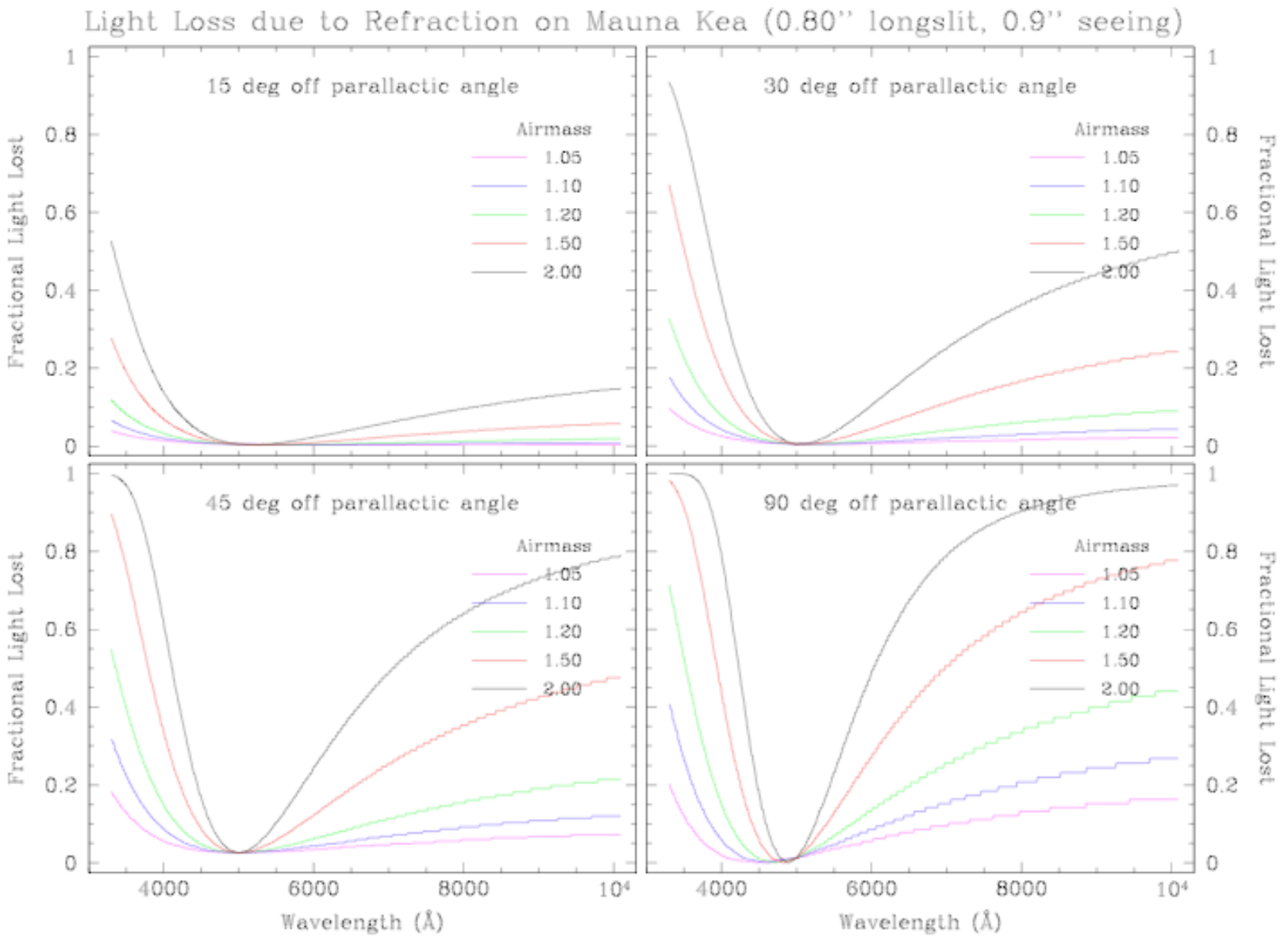
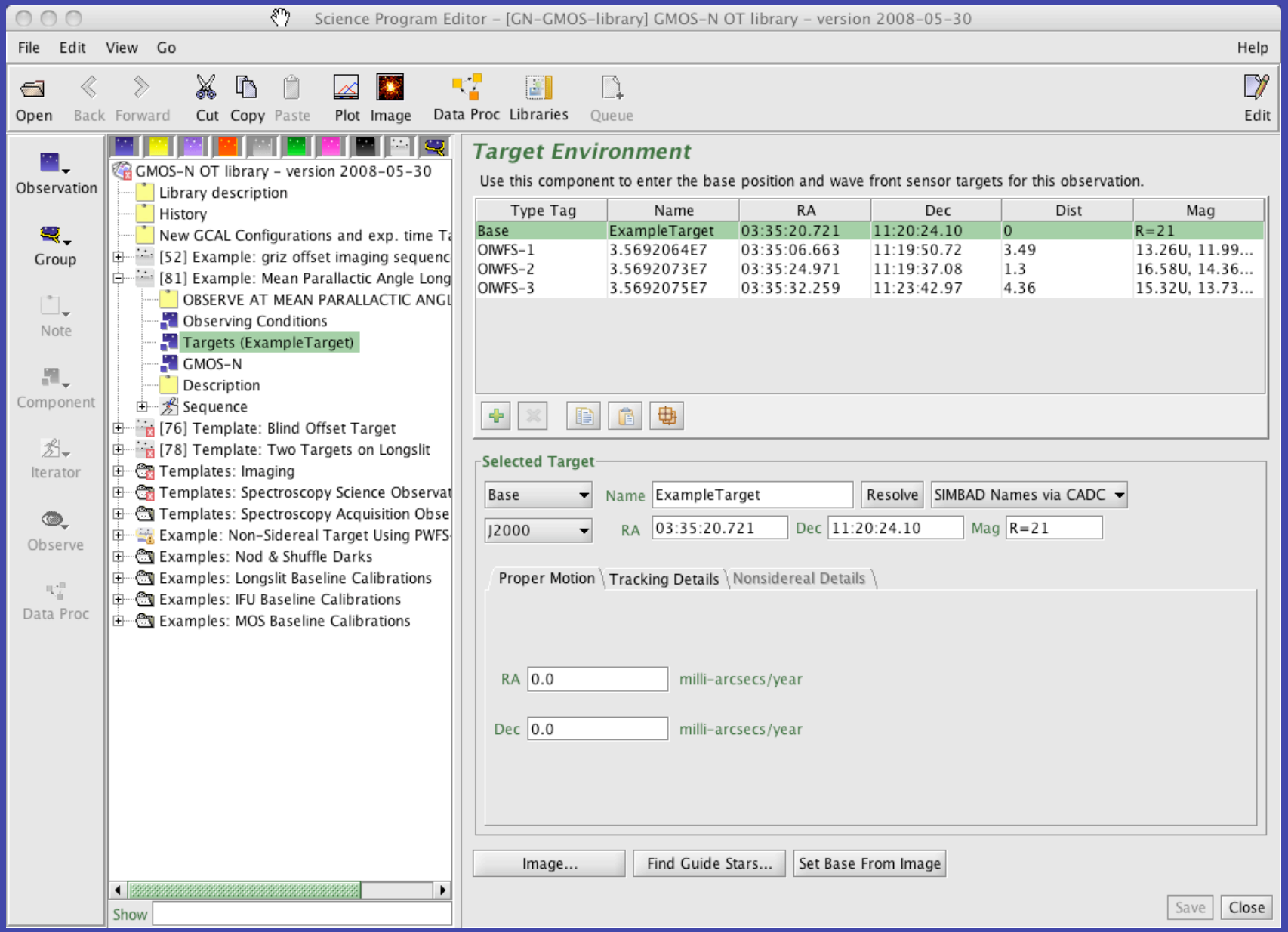


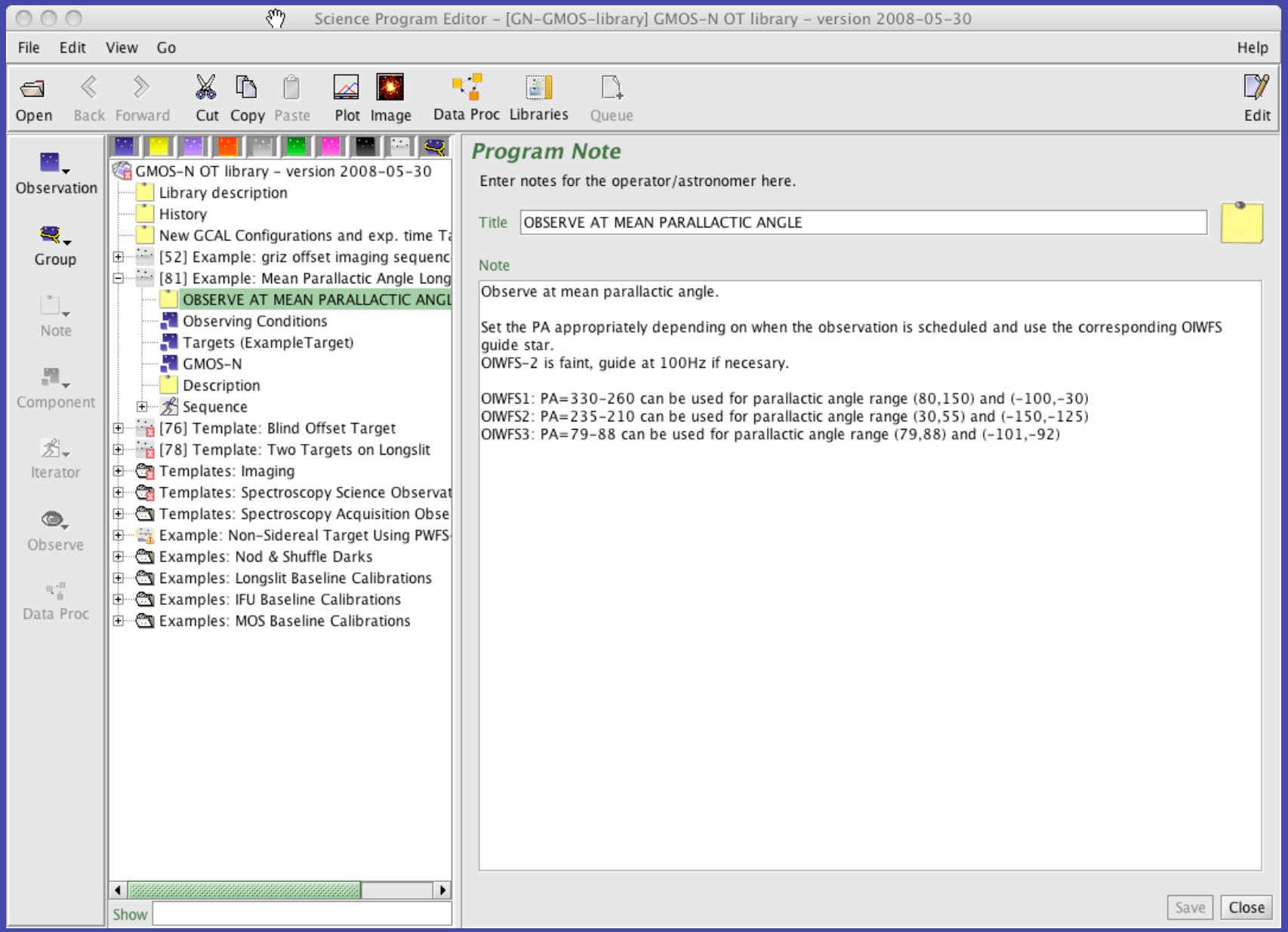
What observing strategies can mitigate the effect; what advise should NGOs and CSs be giving to PIs

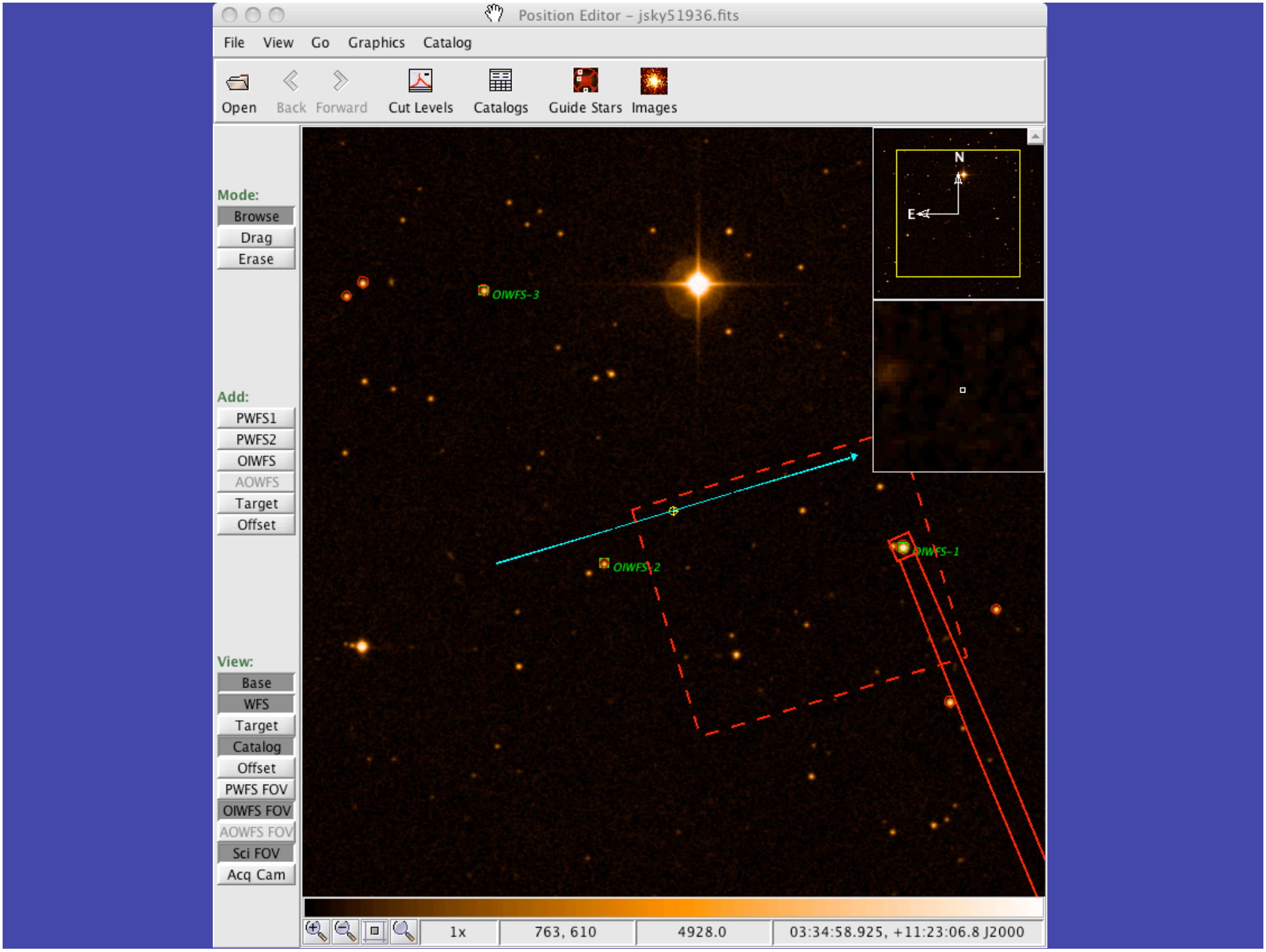
- For imaging only airmass constraints can help; g-band and u-band IQ20 obs especially affected
- For spectroscopy, wavelengths <~ 450 nm affected; narrow slits especially affected. Use the widest slit the science will tolerate.
- Longslit obs may be able to observe at parallactic angle but not always possible due to lack of guide stars
- Custom tilted longslits combined with airmass constraints (?)
- MOS position angle fixed once the mask is designed; consider parallactic angle and guide star when choosing position angle and possible airmass constraints
- For spectroscopy airmass restrictions depend on shortest wavelength covered by spectral setup and total wavelength coverage, as well as slit width (and position angle for MOS)
- VLT VIMOS does not allow PI to choose position angle (fixed at 90deg), Gemini does not want to impose this restriction.
- Keck Deimos not really used below 500 nm; PIs choose position angle appropriate for time of night mask is observed

Parallactic Angle Example in GMOS OT Library



Parallactic Angle Example in GMOS OT Library - cont.




Position Editor – jsky51936.fits
File
View
Go
Graphics
Catalog
Open
Back
Forward
Cut Levels
Catalogs
Guide Stars
Images
Mode:
Browse
Drag
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PWFS1
PWFS2
OIWFS
AOWFS
Target
Offset
View:
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WFS
Target
Catalog
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OIWFS-2
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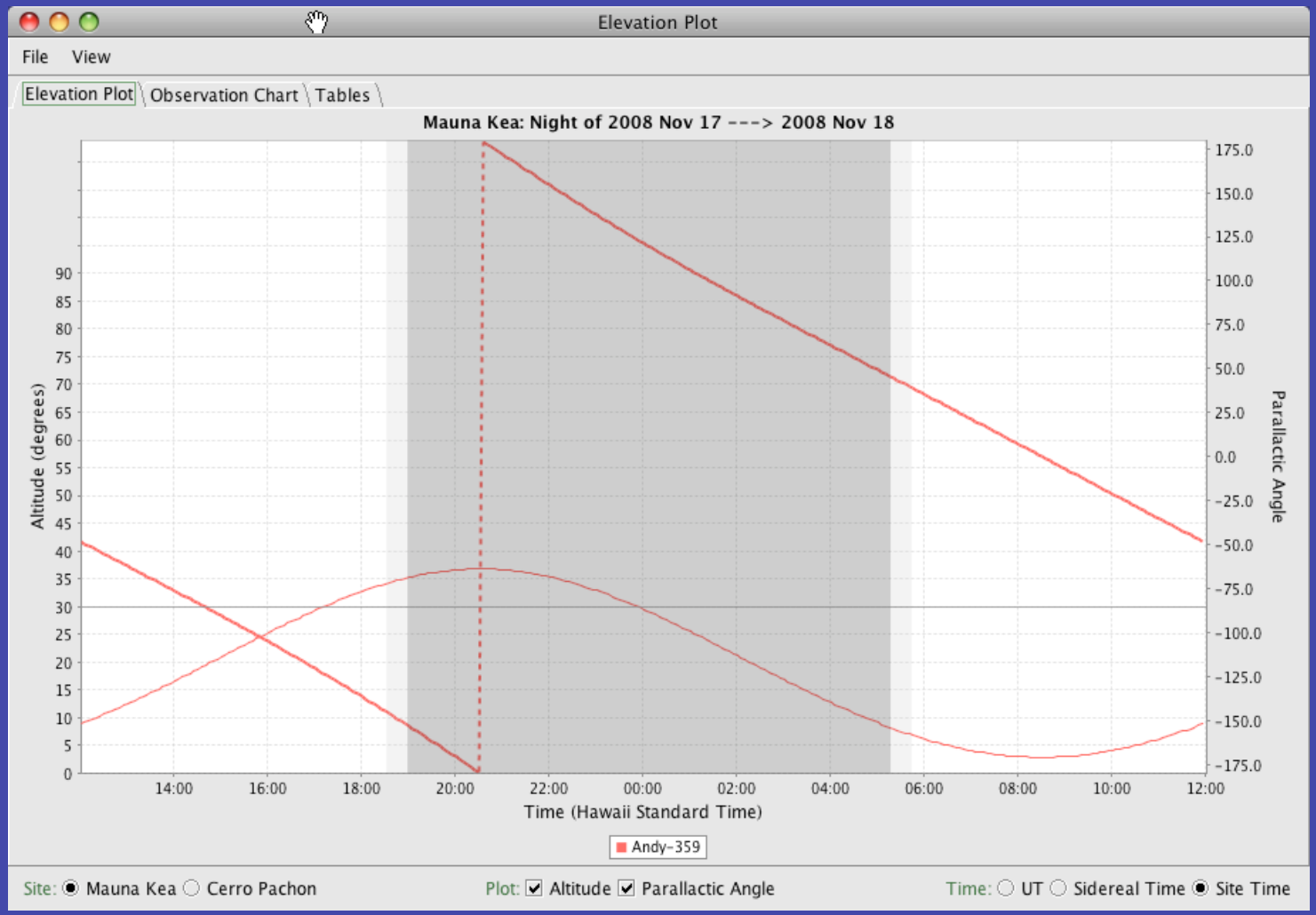
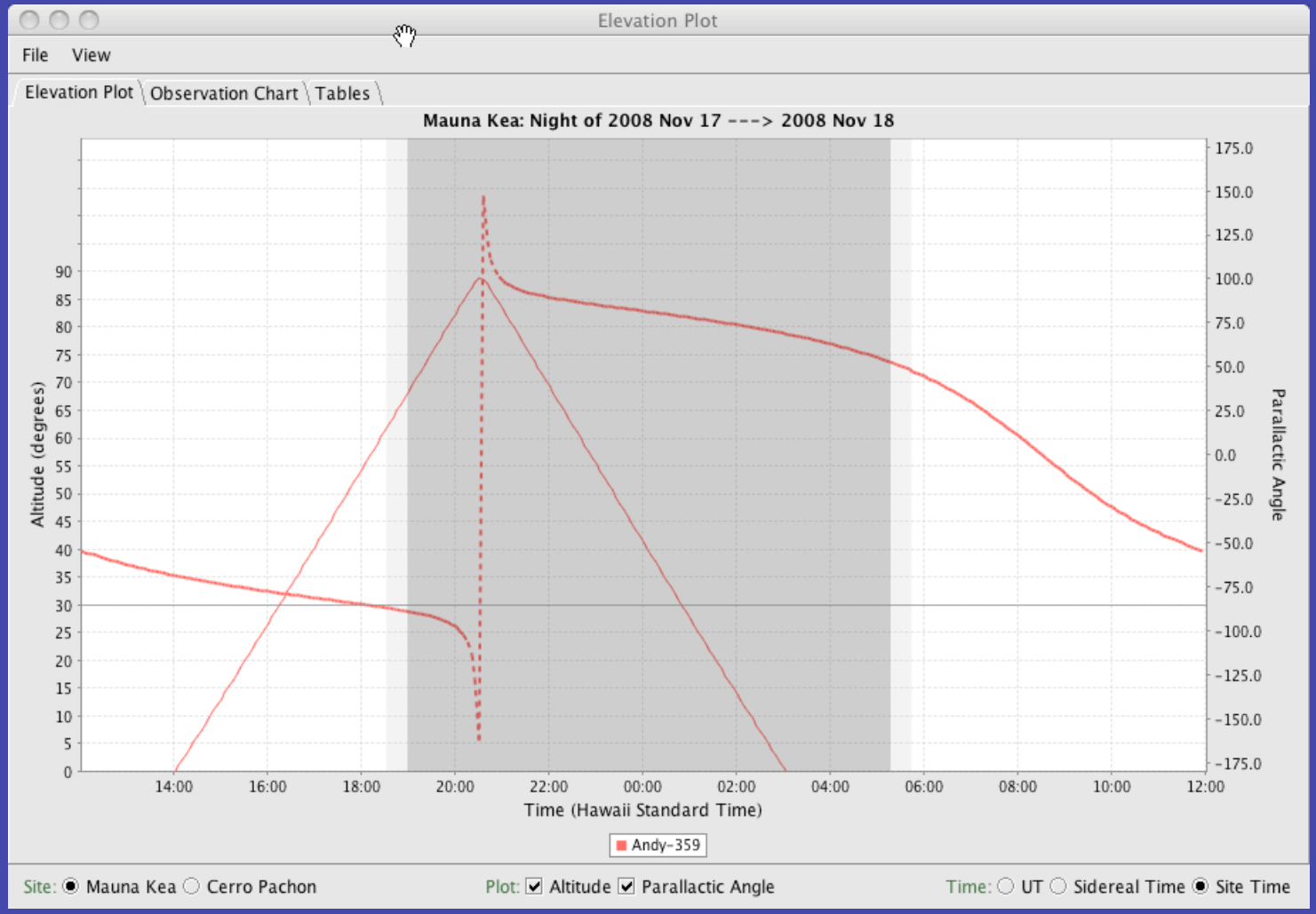
03:34:58.925, +11:23:06.8 J2000

Elevation & parallactic angle OT plot
Mauna Kea, Dec = 73deg



Elevation & parallactic angle OT plot Mauna Kea, Dec = 21deg



Discussion

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