Available Keck NGAO Point Spread Functions

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This note is intended to provide a brief guide to the PSFs that can be found at ftp://ftp.keck.hawaii.edu/outgoing/kpao/. All of these are simulations, with the exception of the RYScuti folder. More details can be found in the README files in some of the folders.

Folder Name	Conjugate Type	RMS wavefront error (nm) on-axis	Wavelength Bands	Off-axis blurring (mas)
KPAO120	SCAO	120	R,I,J,H,K	0
nfao (see Fig. 1)	SCAO	105	V,R,I,J,H,K	0
nfaoSeeingVar	SCAO	90-130	V,R,I.J,H,K	0
nfao170	SCAO	~170	V,R,I,J,H,K	0
nfao140	SCAO	~140	V,R,I,J,H,K	0
singleLGS (see Fig. 2)	SCAO (super K1 LGS)	226	V,R,I,J,H,K	0
mcaoKPAO (see Fig. 3)	MCAO	100	V,R,I,J,H,K	0
RYScuti	SCAO (actual K2 NGS AO images)		Lp,Ms	

- The first seven folders contain simulations produced by Chris Neyman.
- A side-by-side comparison of some of the images can be found in the figures below (thanks to Ralf Flicker).
- The RYScuti folder contains images from the existing K2 AO system for comparison (thanks to David Le Mignant).
- Some K2 LGS AO images can be found at http://www2.keck.hawaii.edu/optics/lgsao/performance.html.
- In answer to requests about how the blurring relates to on-axis star magnitude and sky coverage Chris provided the following table with the following comments: "In the on-axis case, we can take advantage of the sharpening of the tip/tilt tracking star by the AO system. If we design a R band tracking with the correct plate scale, then the R magnitudes for the errors I generated in the PSF's would be *(those listed in the following table)*. Remember these stars are on axis (almost never the case) and I'm taking full advantage of the sharpening of the guide star by AO."

Blurring (mas)	Rmag	% sky coverage at galactic NP
8	18.2	50
15	20.6	90
25	22.3	Complete

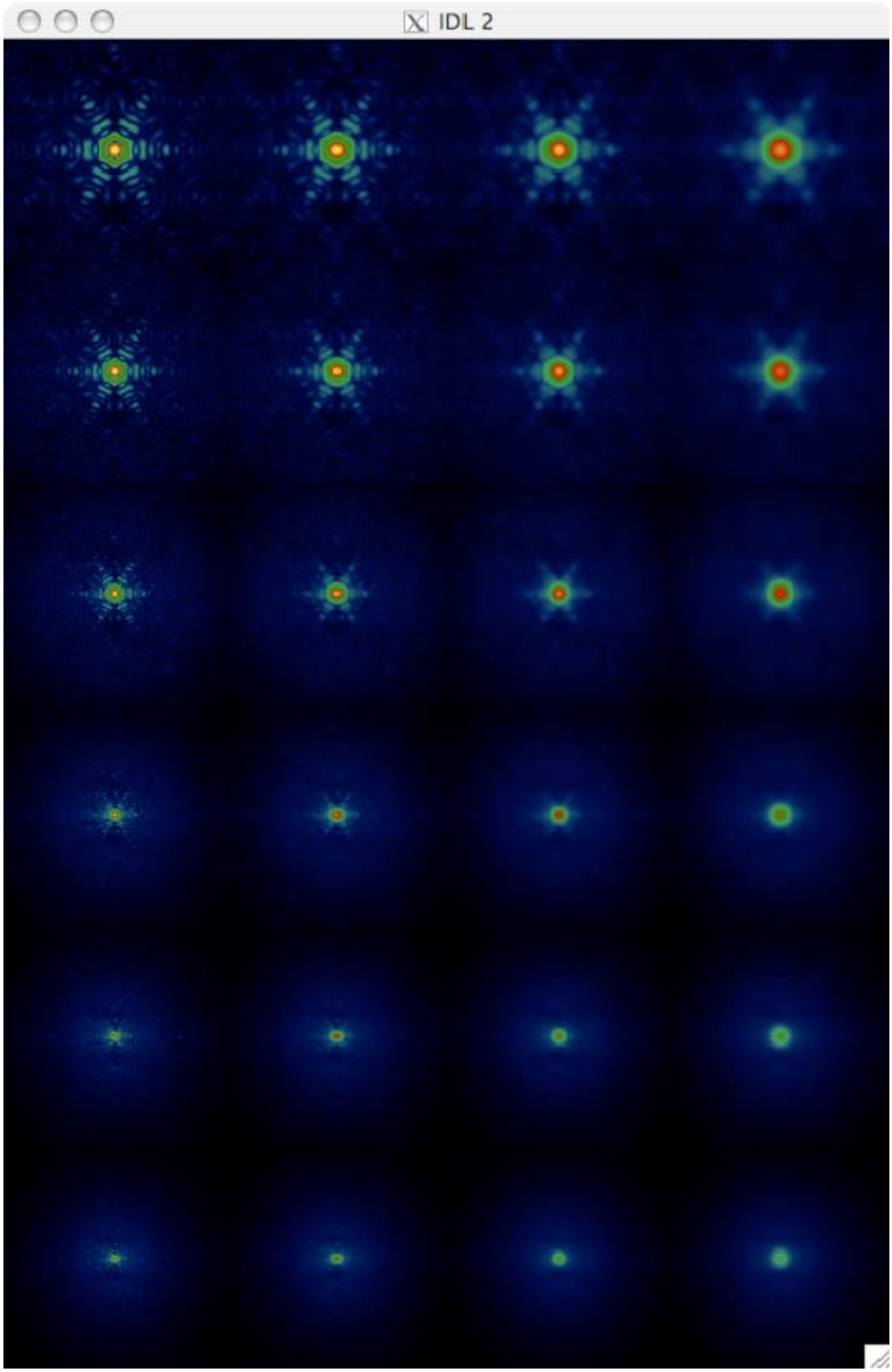

Figure 1. nfao case. Wavelength decreases from top to bottom. Tip/tilt increases from left to right.

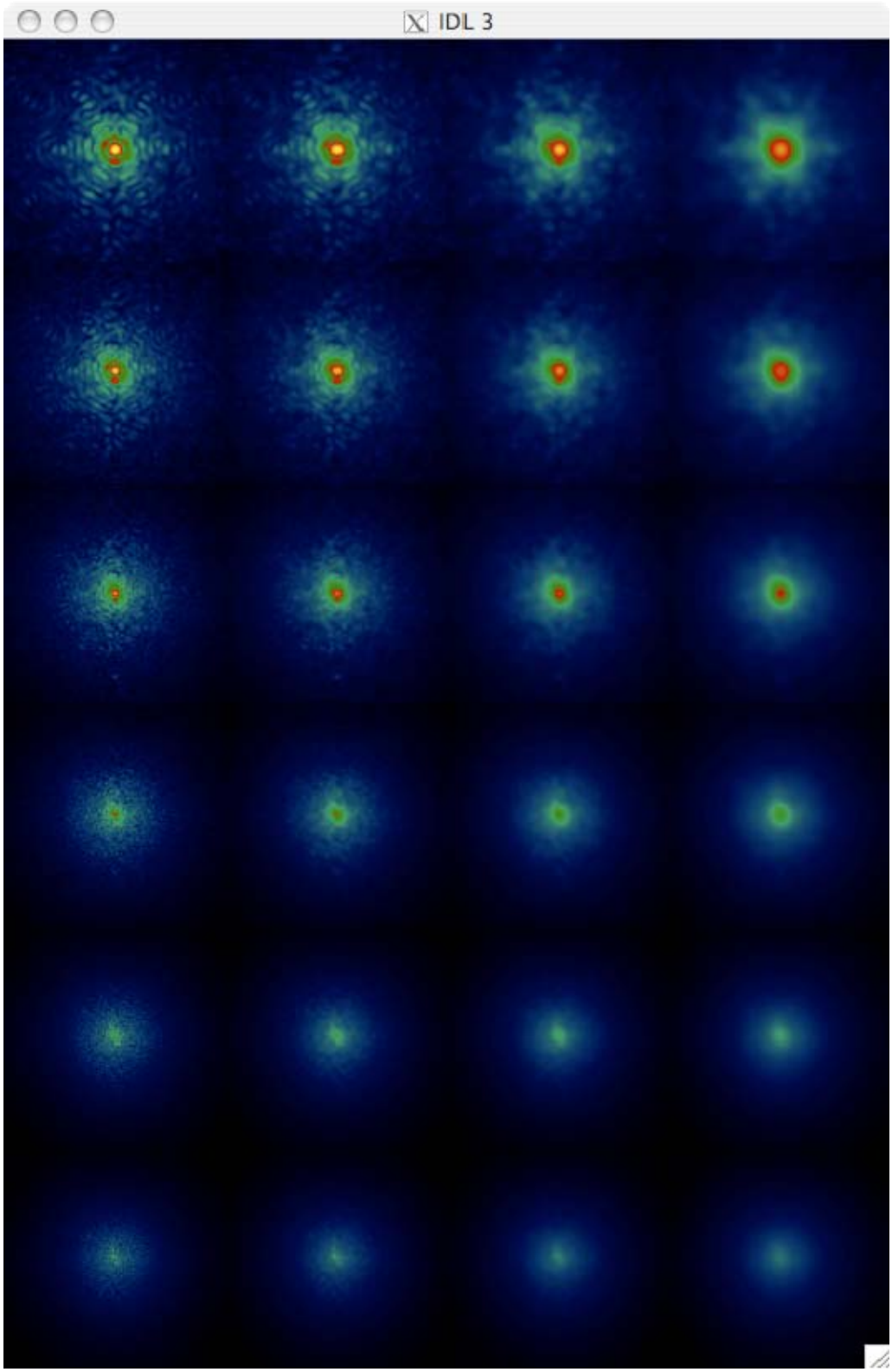

Figure 2. singleLGS case.

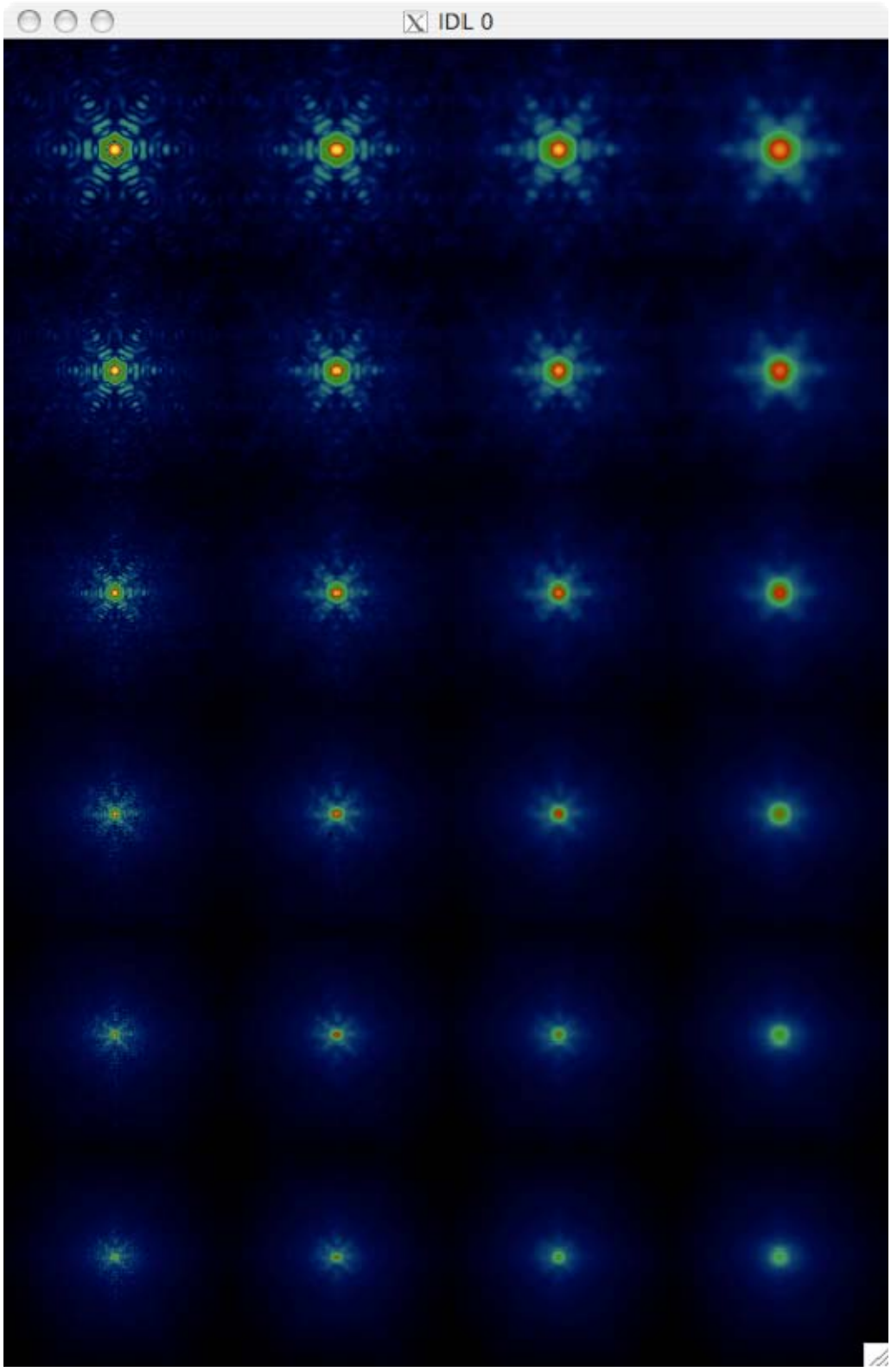

Figure 3. mcaoKPAO case.