

## APLC Design Summary

Instrument	USORT
nPup	512 x 512 pixels
Coronagraphic throughput (transmitted energy)	0.185
Core throughput (encircled energy)	0.1534
Lyot stop inner diameter (% of inscribed circle)	0.0
Lyot stop outer diameter (% of inscribed circle)	0.99
Bandpass	15.0%
# wavelengths	5
FPM radius (grayscale)	3.5 $\lambda/D$
nFPM	150 pixels
IWA — OWA	3.4—14.0 $\lambda/D$
Contrast constraint	$10^{-10}$
Lyot Stop alignment tolerance	1 pixels

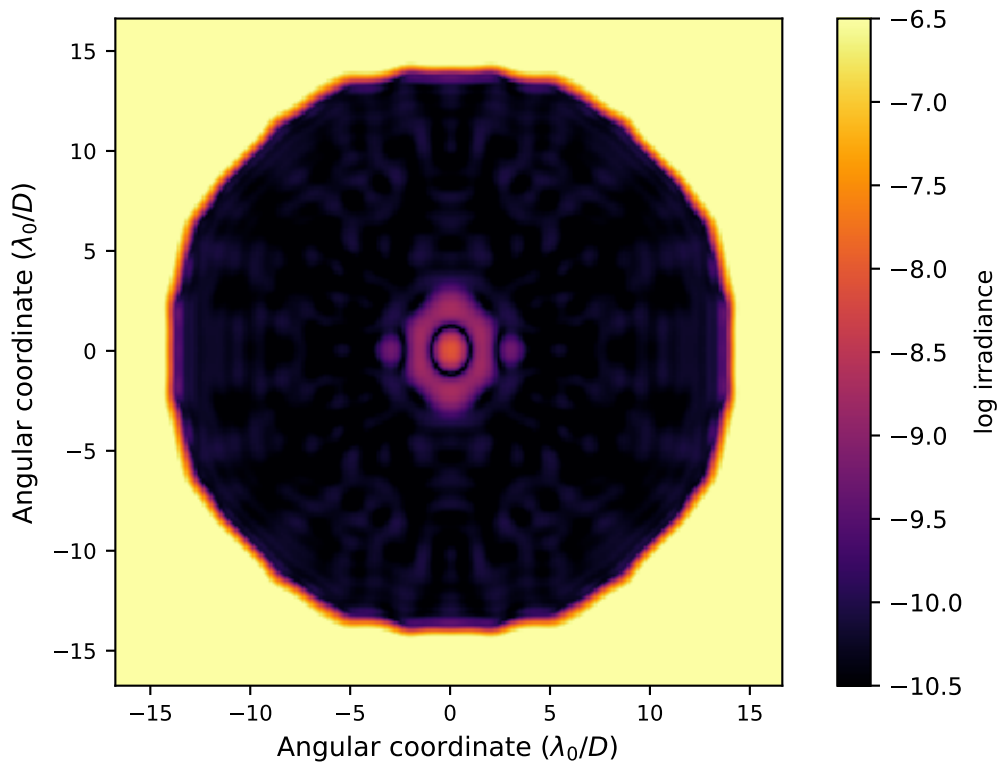
### Input Files :

- ▷ *Pupil file* : USORT/TelAp\_USORT\_offaxis\_ovsamp16\_N0512.fits
- ▷ *Lyot stop file* : USORT/LS\_USORT\_hex\_ID0000\_OD0990\_ovsamp16\_N0512.fits

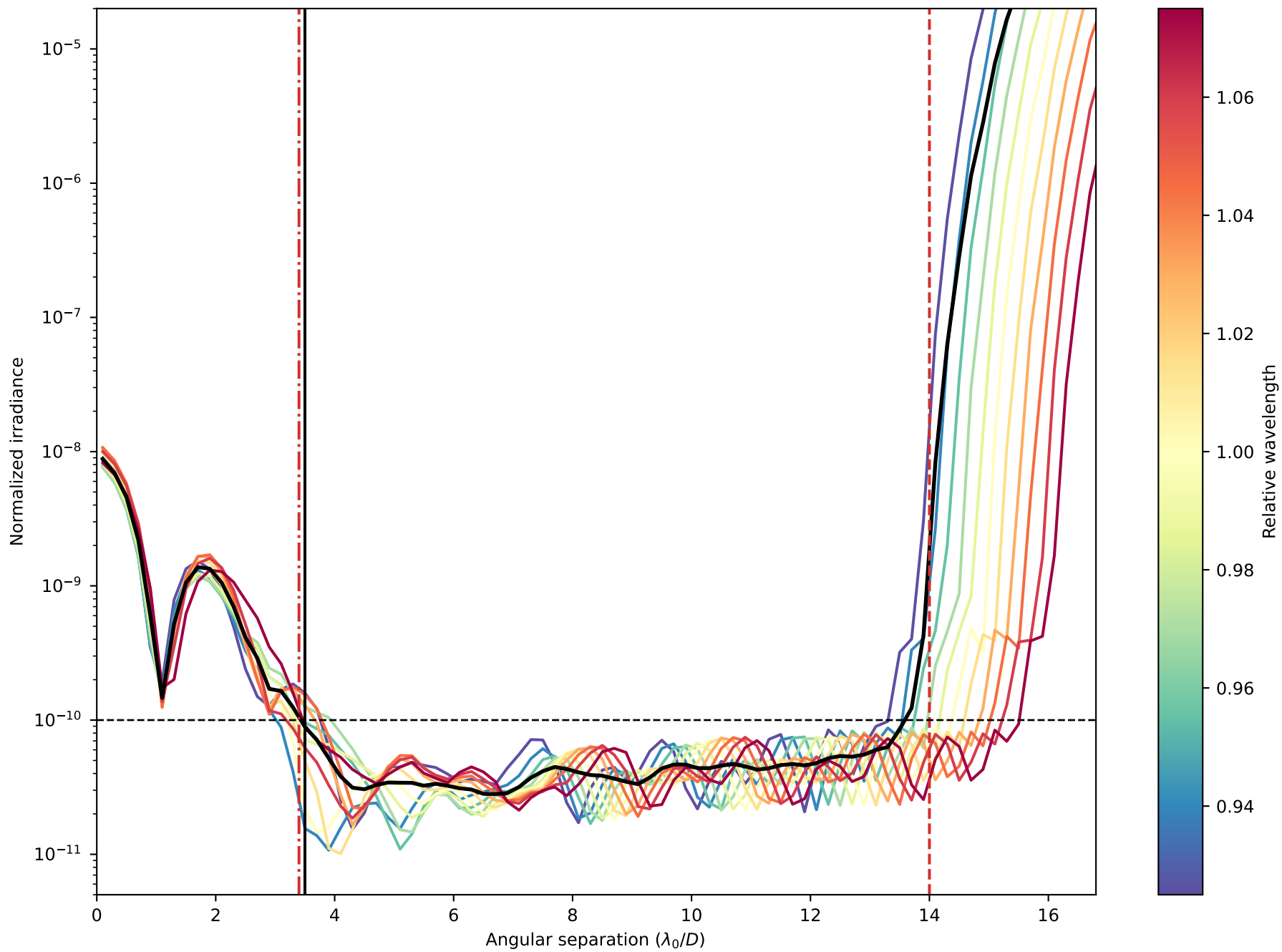
### Solution File :

▷ 07\_USORT\_N512\_FPM350M0150\_IWA0340\_OWA01400\_C10\_BW15\_Nlam5\_LS\_ID\_ID00\_ODOD09\_Is\_0\_ovsamp16\_N.fits

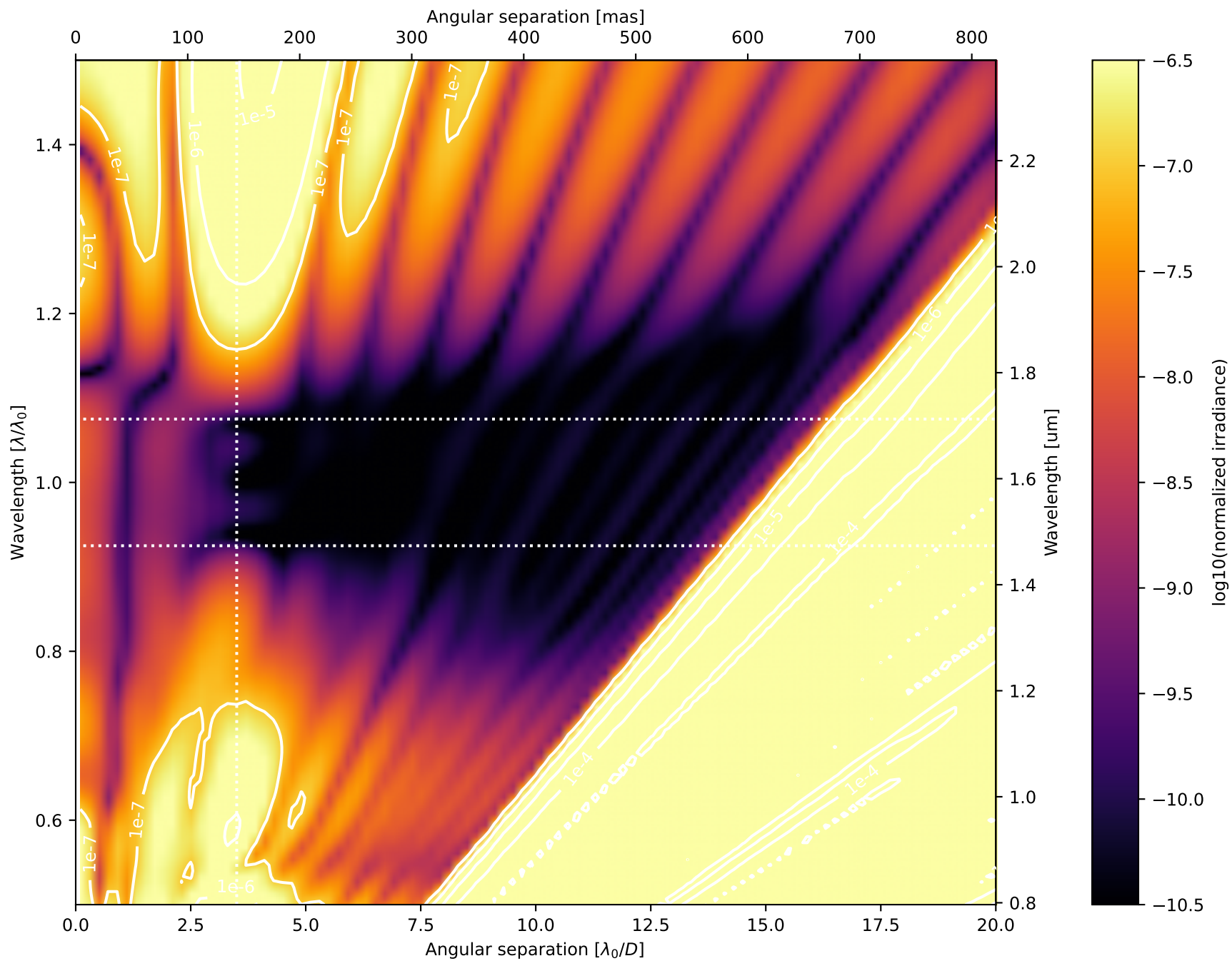
Mon Oct 30 22:44:04 2023

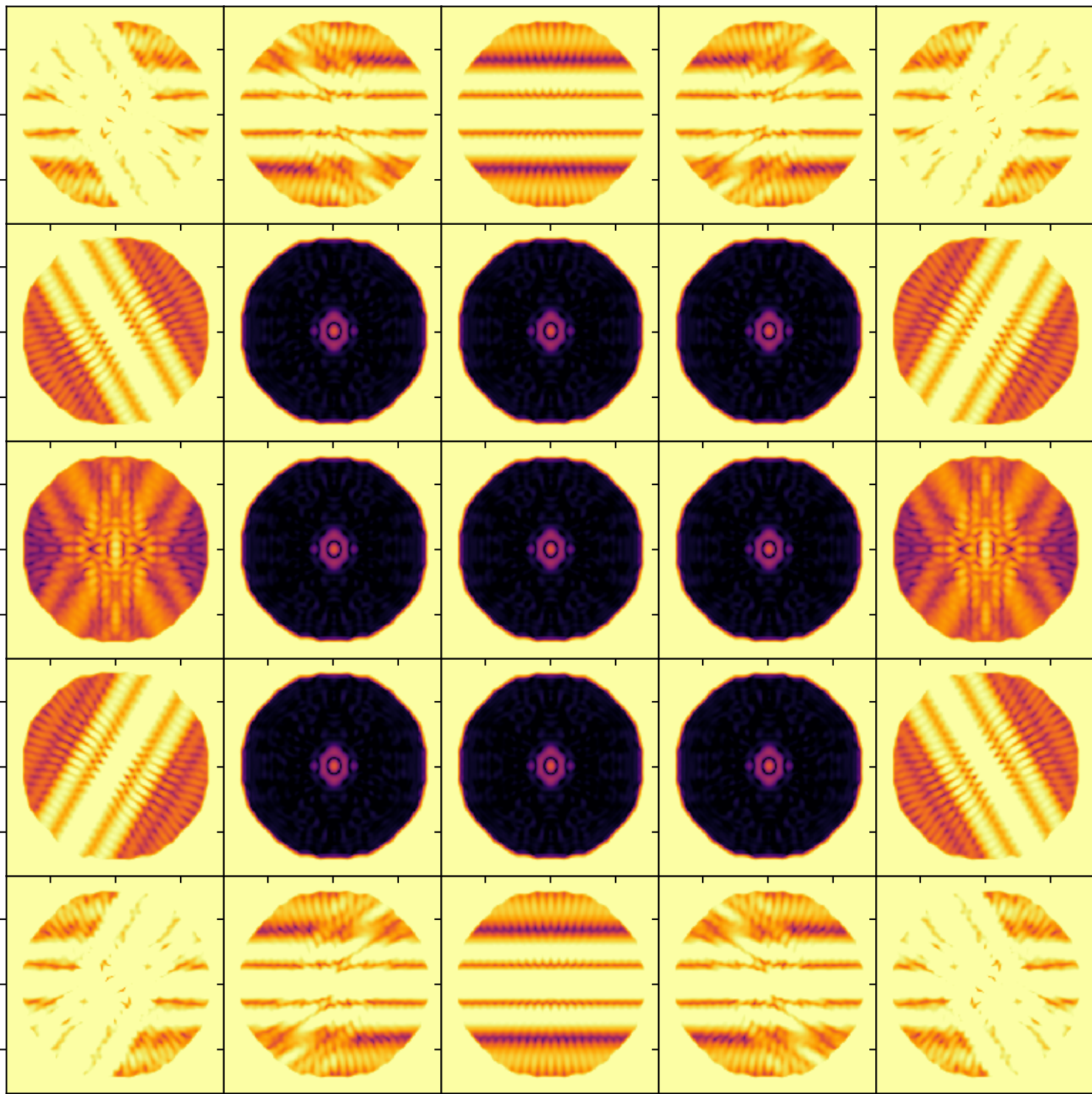


*On – axis PSF in log irradiance,  
normalized to the peak irradiance value.*

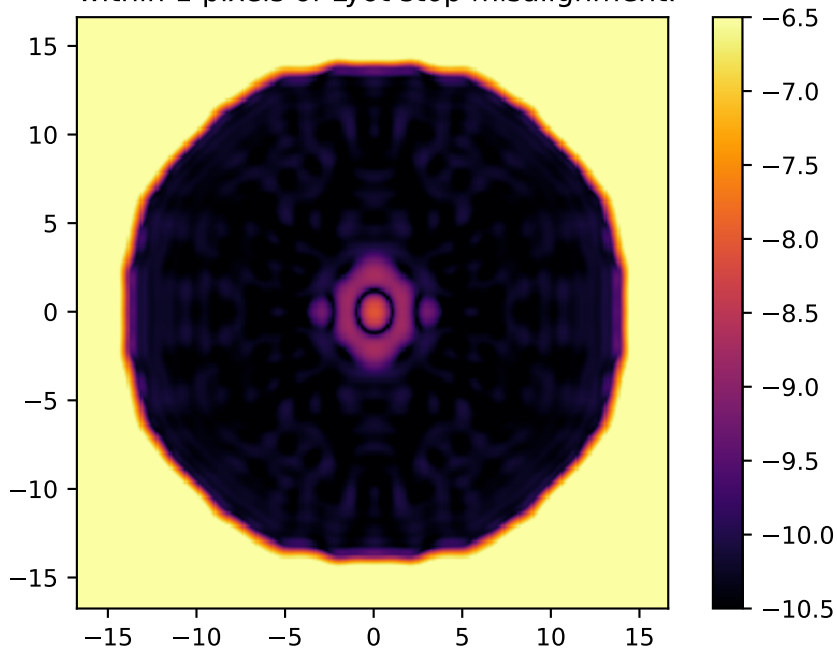


Radial intensity profile for the broadband APLC design at 11 simulated wavelengths centered around  $\lambda_0/D$  and equally spatially sampled over the 15.0% bandpass. The black curve shows the average intensity across the 11 wavelength samples. The dashed red vertical lines delimit the high-contrast dark zone (between  $3.4$  and  $14.0 \lambda_0/D$ ). The blue dotted line delimits the FPM radius, set to  $3.5 \lambda_0/D$ .



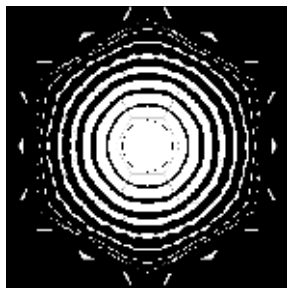


Average broadband normalized irradiance  
within 1 pixels of Lyot stop misalignment.



# ***Analysis Summary***

Apodizer &  
Telescope Aperture



Lyot plane

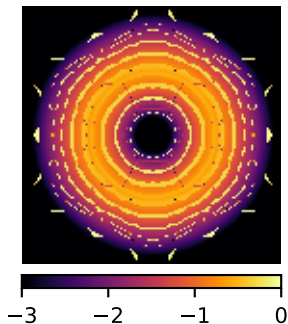
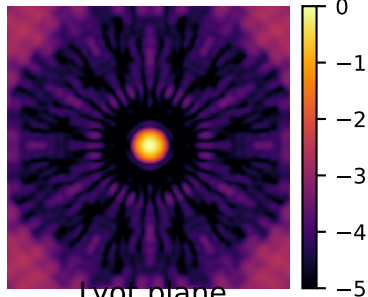


Image plane



Lyot plane  
w/lyot stop

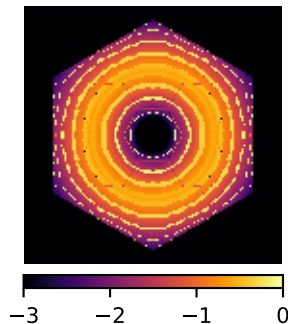
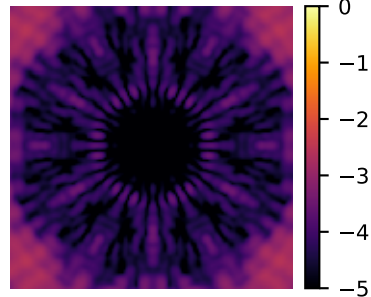
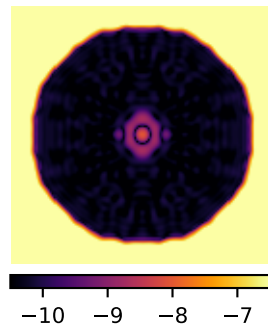
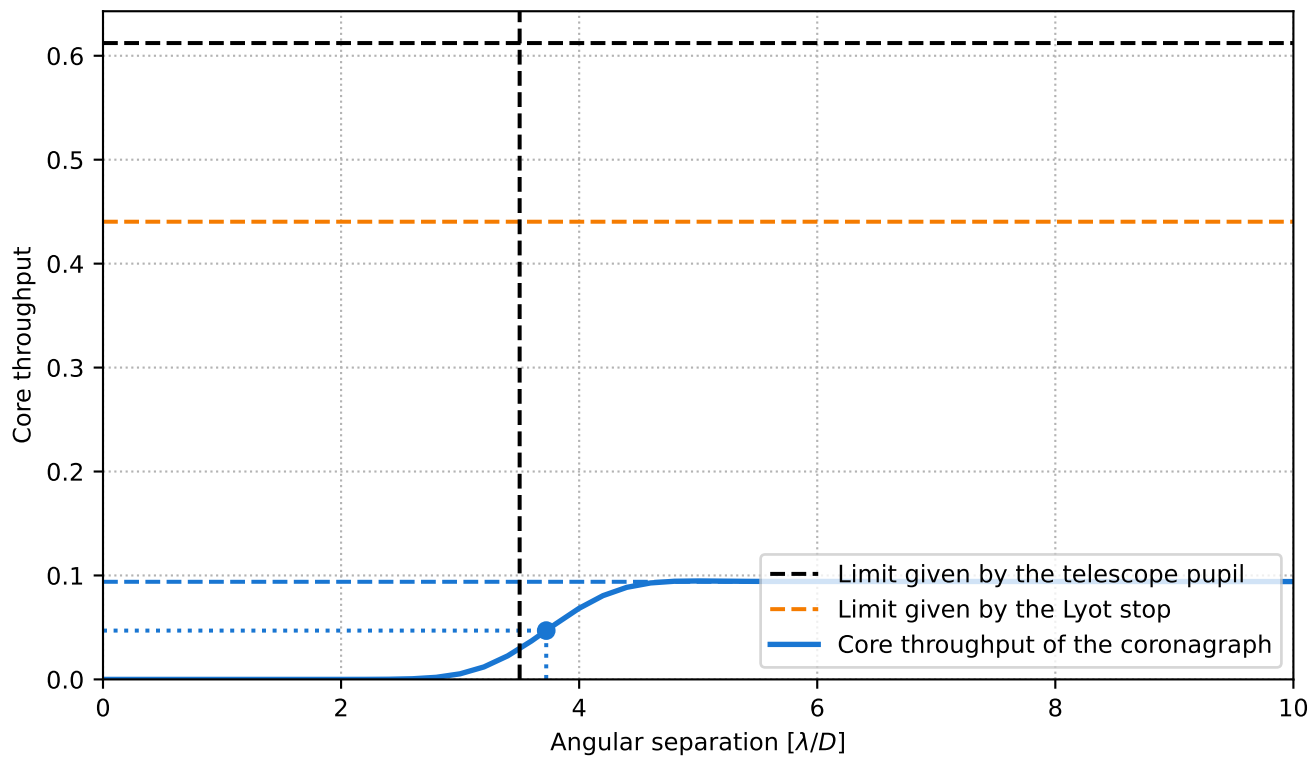


Image plane  
w/FPM



Final image plane

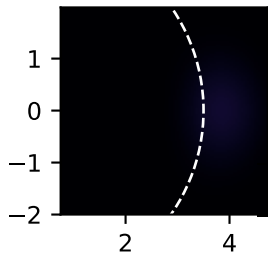




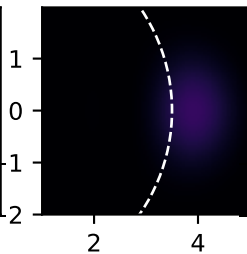
Pupil core throughput:	0.6122241018617949
Lyot stop core throughput:	0.44033728663207494
Maximum core throughput:	0.09391256510919027
Maximum core throughput w.r.t. pupil core throughput:	0.15339573339827506
Maximum core throughput w.r.t. Lyot stop core throughput:	0.21327416042252897
Inner working angle:	3.723386193685184 $\lambda_0/D$



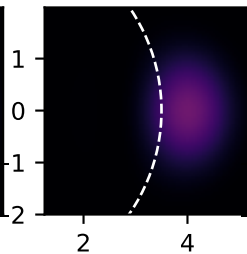
$2.75 \lambda_0/D$



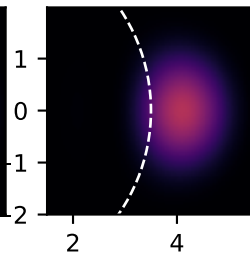
$3.00 \lambda_0/D$



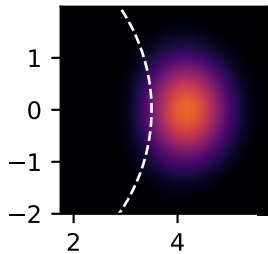
$3.25 \lambda_0/D$



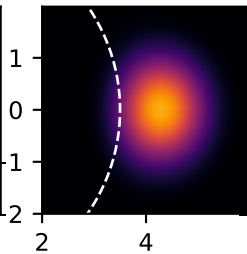
$3.50 \lambda_0/D$



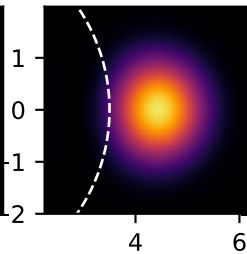
$3.75 \lambda_0/D$



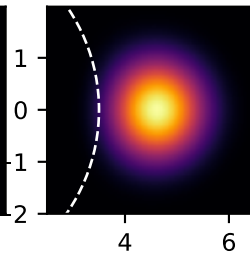
$4.00 \lambda_0/D$



$4.25 \lambda_0/D$

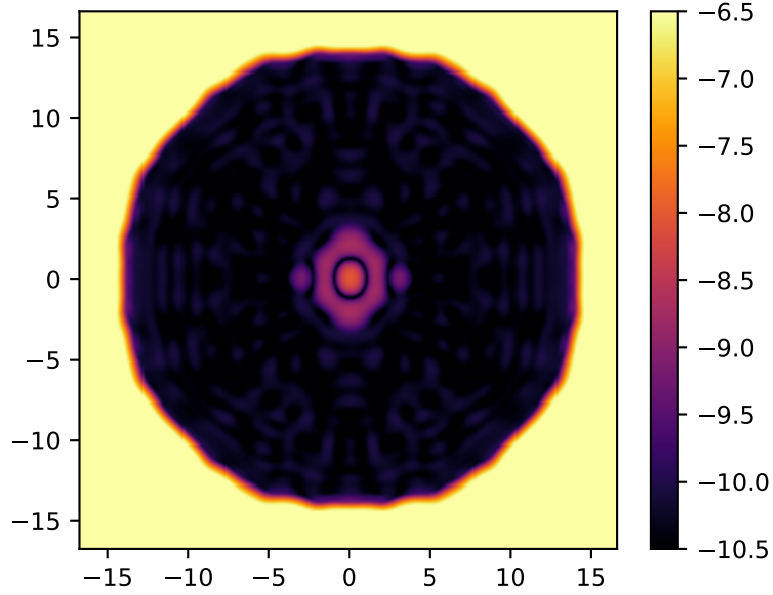


$4.50 \lambda_0/D$

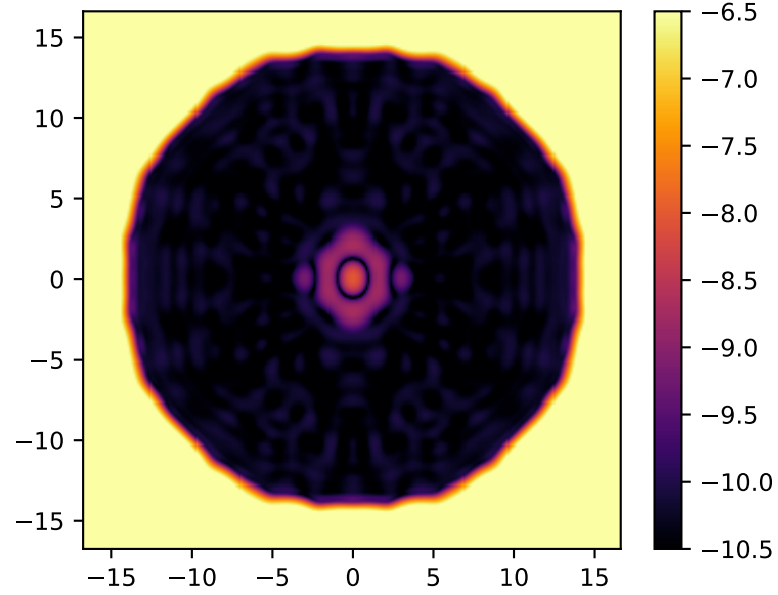


Broadband normalized irradiance for four representative levels of residual pointing jitter.

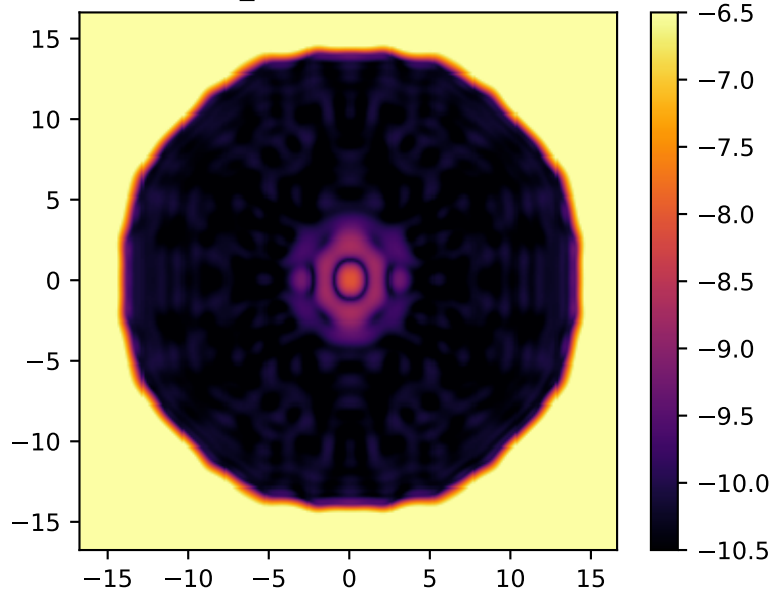
$\sigma_{\text{rms}} = 0.01 \lambda/D$



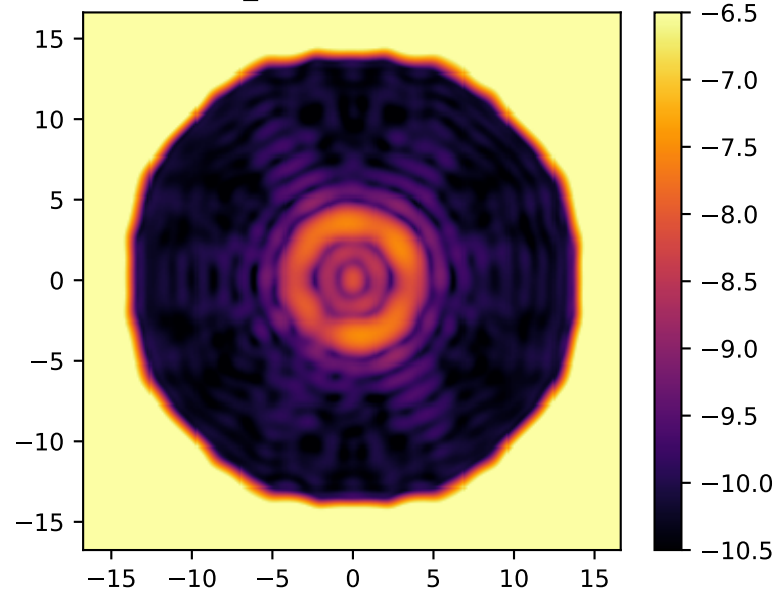
$\sigma_{\text{rms}} = 0.03 \lambda/D$

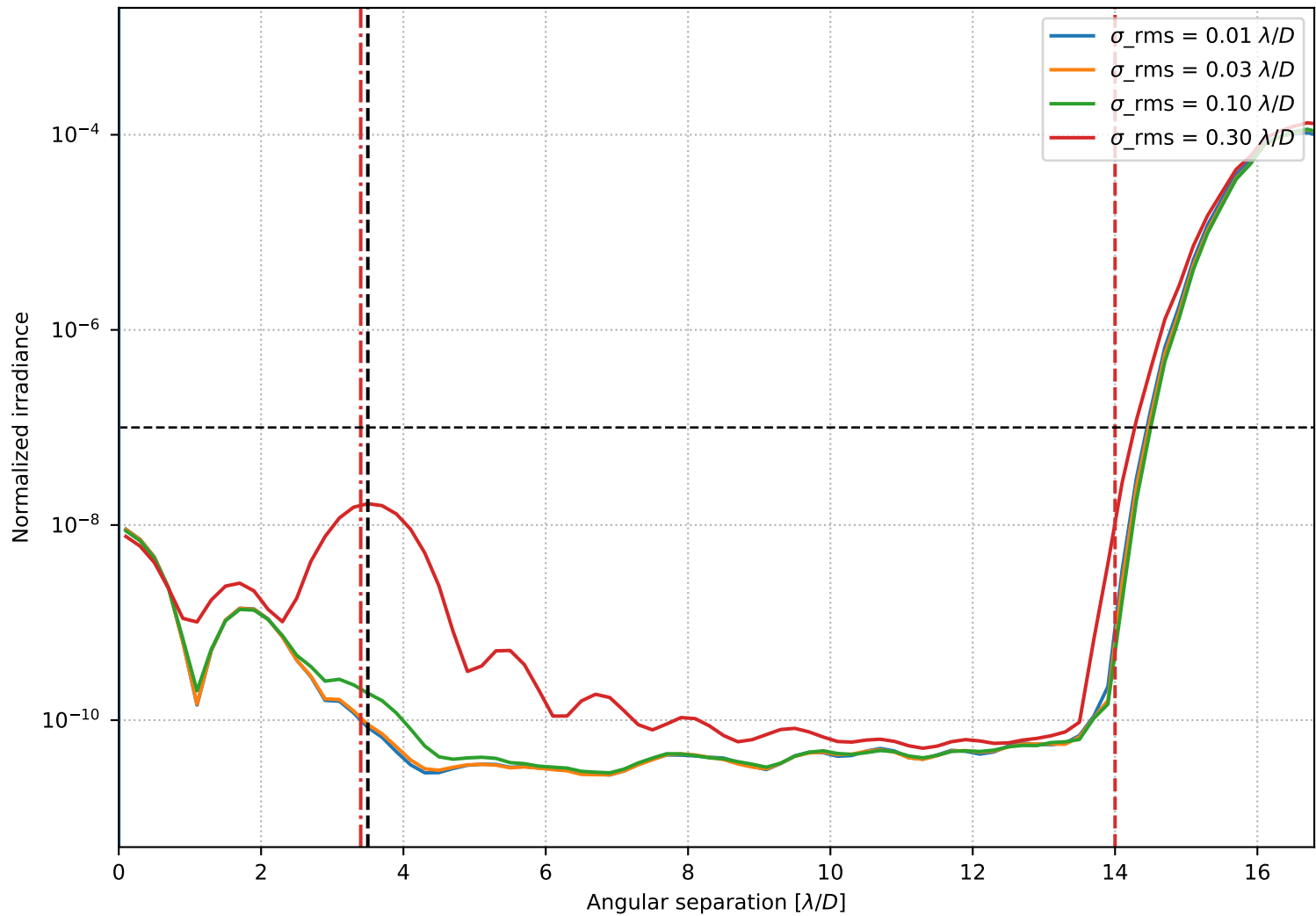


$\sigma_{\text{rms}} = 0.10 \lambda/D$



$\sigma_{\text{rms}} = 0.30 \lambda/D$





Azimuthally averaged raw contrast for four representative levels of rms residual pointing jitter.