

## APLC Design Summary

Instrument	USORT
nPup	128 x 128 pixels
Coronagraphic throughput (transmitted energy)	0.0941
Core throughput (encircled energy)	0.082
Lyot stop inner diameter (% of inscribed circle)	0.0
Lyot stop outer diameter (% of inscribed circle)	0.99
Bandpass	20.0%
# wavelengths	5
FPM radius (grayscale)	3.6 $\lambda/D$
nFPM	150 pixels
IWA — OWA	3.5—14.0 $\lambda/D$
Contrast constraint	$10^{-10}$
Lyot Stop alignment tolerance	0 pixels

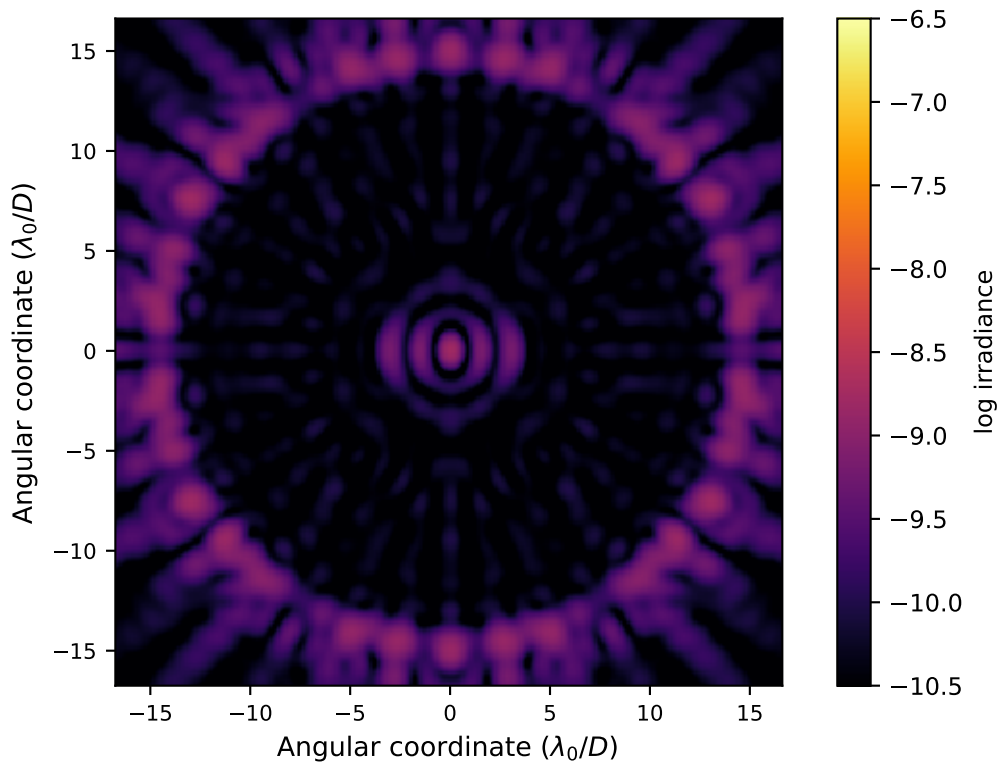
### Input Files :

- ▷ *Pupil file* : USORT/TelAp\_USORT\_offaxis\_ovsamp16\_N0128.fits
- ▷ *Lyot stop file* : USORT/LS\_USORT\_circ\_ID0000\_OD0990\_ovsamp16\_N0128.fits

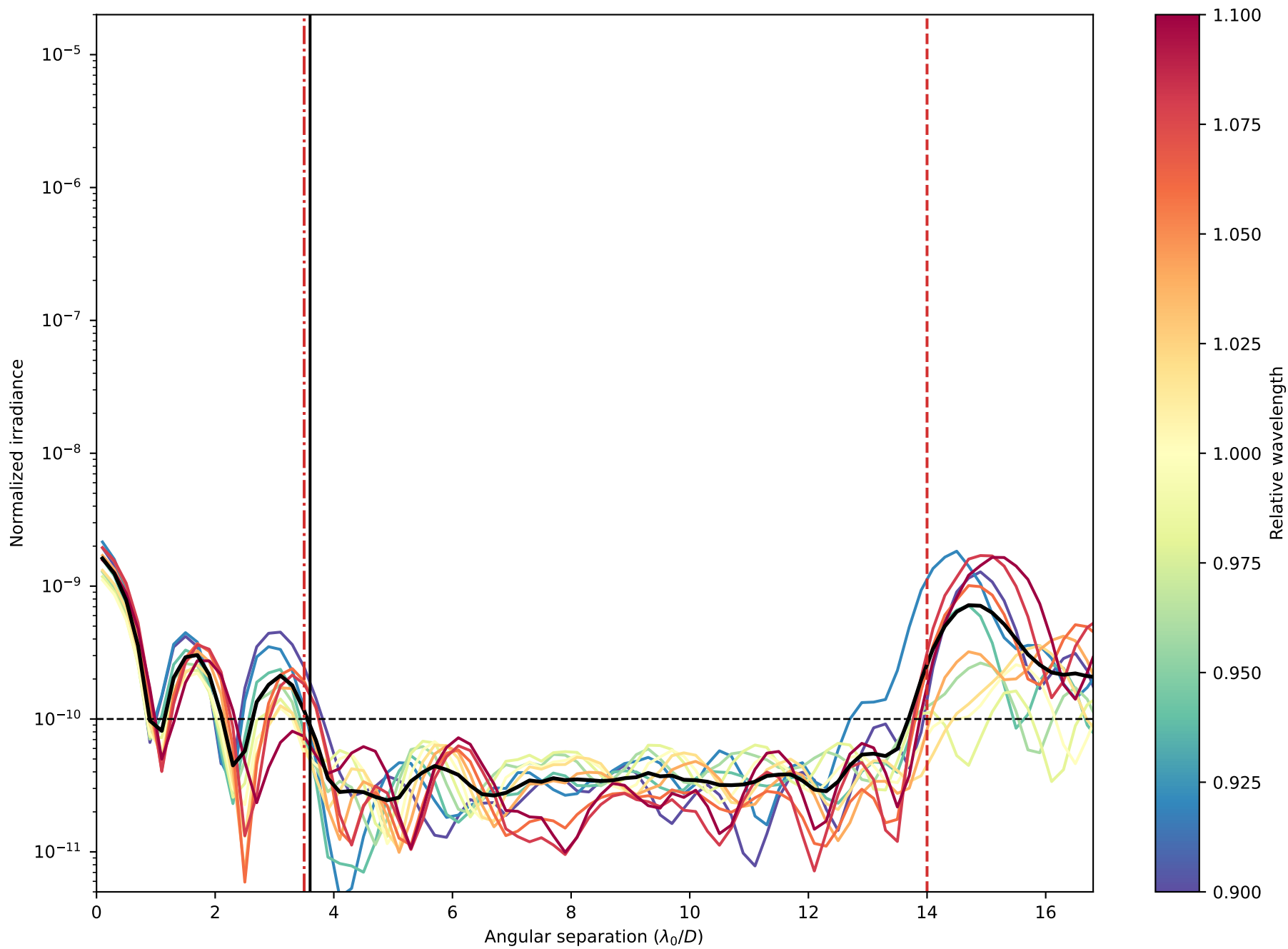
### Solution File :

▷ 05\_USORT\_N128\_FPM360M0150\_IWA0350\_OWA01400\_C10\_BW20\_Nlam5\_LS\_IDc\_ID0\_OD\_OD0\_ls\_90\_ovsamp16\_fits

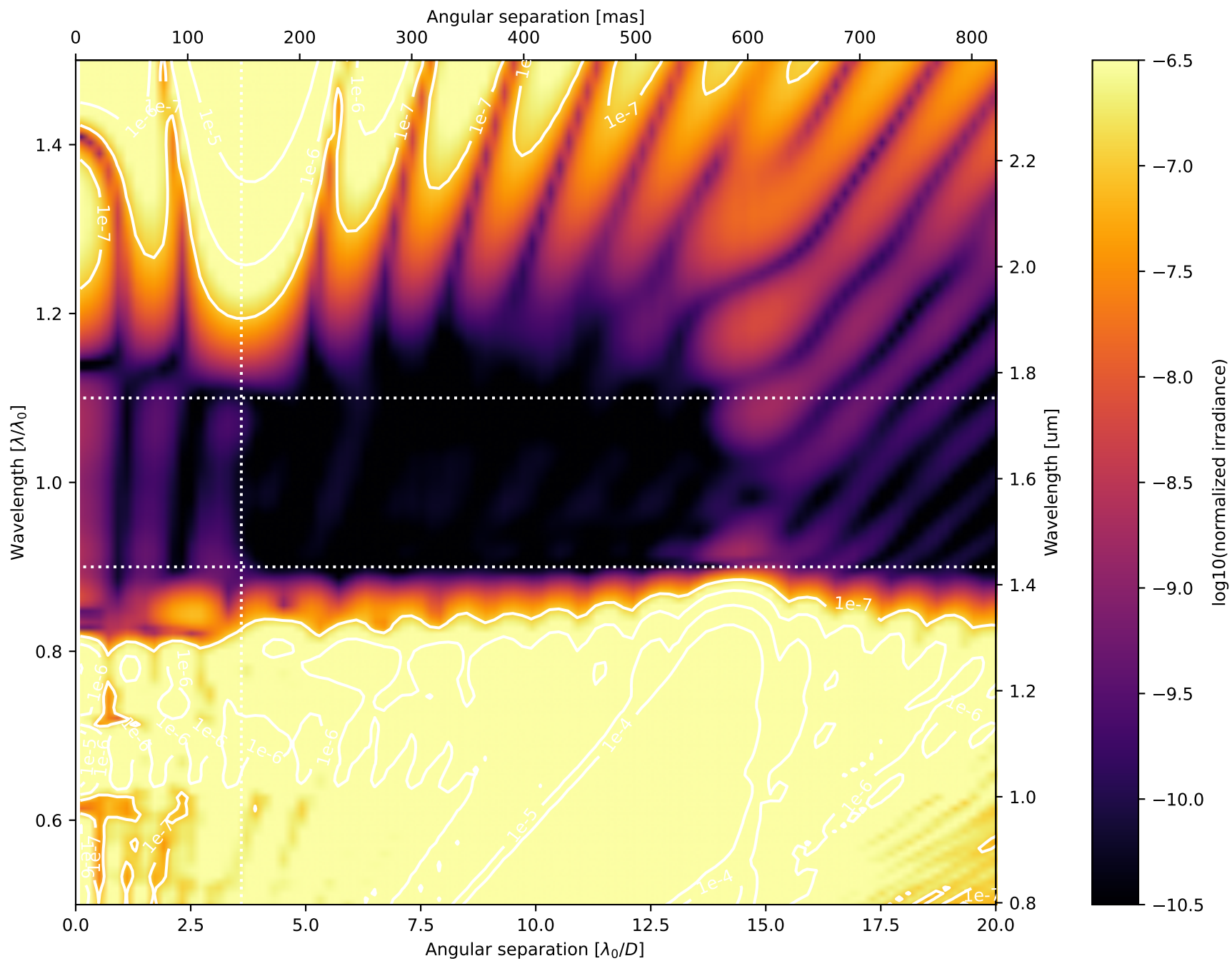
Fri Oct 27 16:29:17 2023

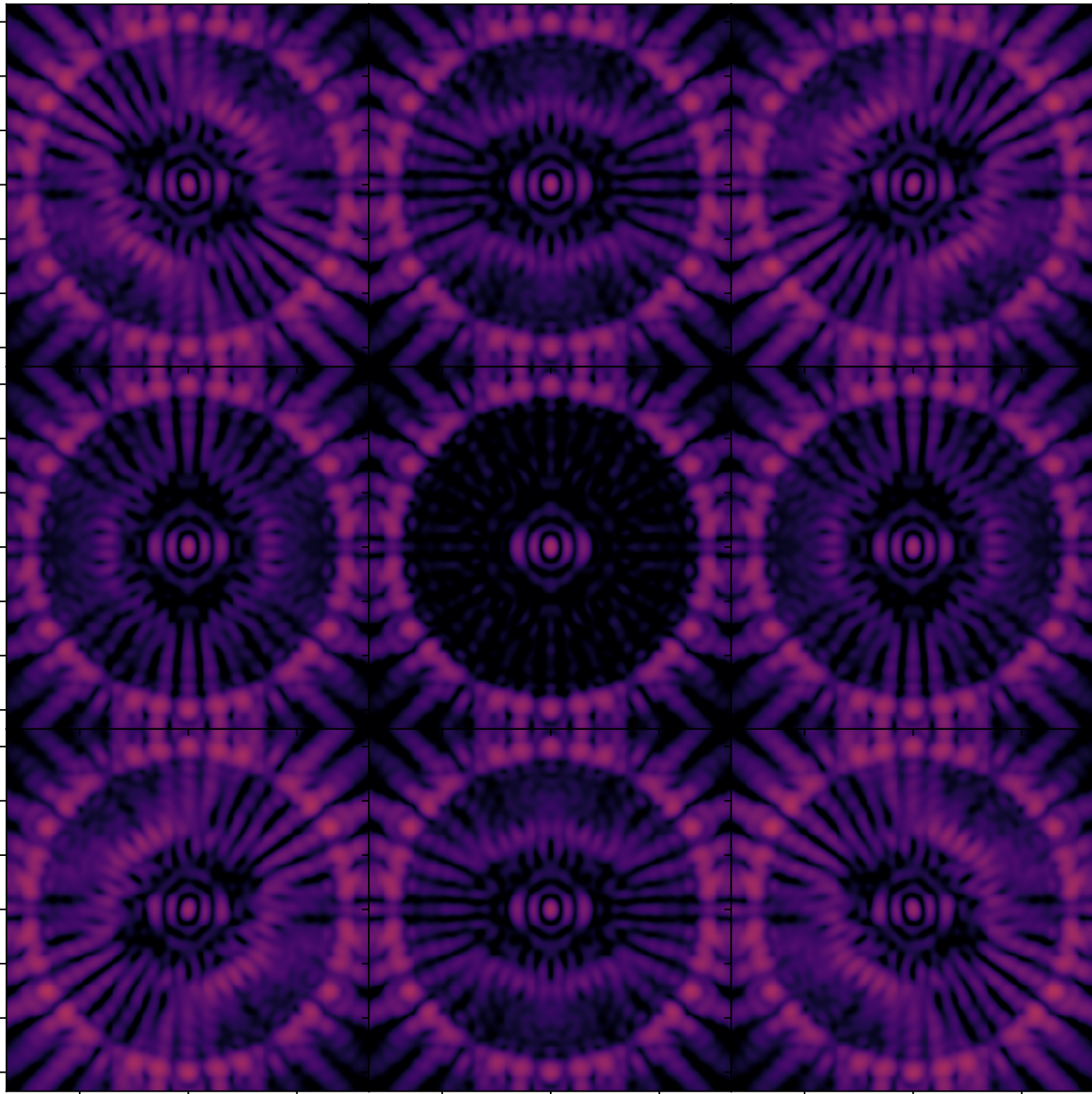


*On – axis PSF in log irradiance,  
normalized to the peak irradiance value.*

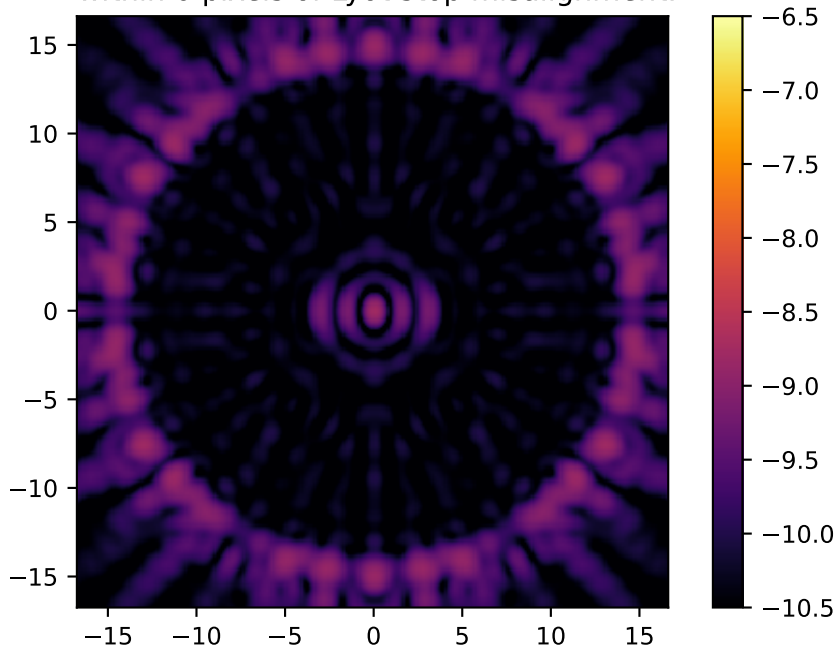


Radial intensity profile for the broadband APLC design at 11 simulated wavelengths centered around  $\lambda_0/D$  and equally spatially sampled over the 20.0% bandpass. The black curve shows the average intensity across the 11 wavelength samples. The dashed red vertical lines delimit the high-contrast dark zone (between  $3.5$  and  $14.0 \lambda_0/D$ ). The blue dotted line delimits the FPM radius, set to  $3.6 \lambda_0/D$ .





Average broadband normalized irradiance  
within 0 pixels of Lyot stop misalignment.



# Analysis Summary

Apodizer &  
Telescope Aperture

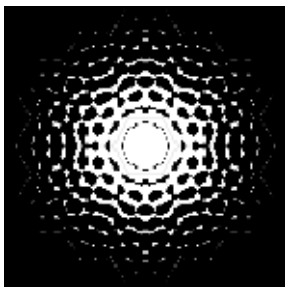


Image plane

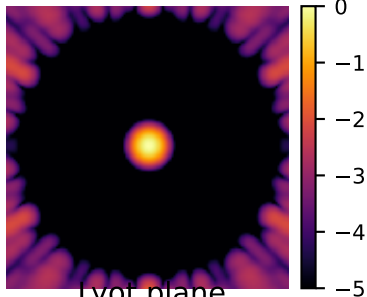
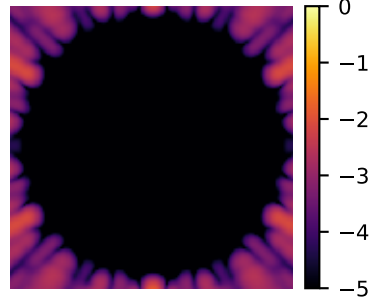
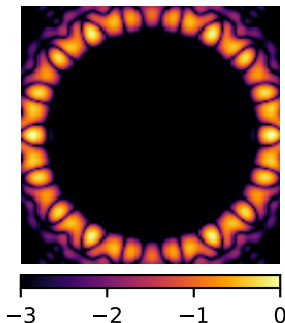


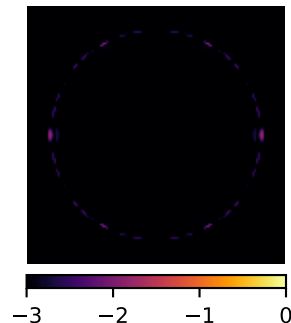
Image plane  
w/FPM



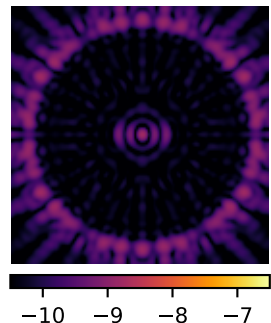
Lyot plane

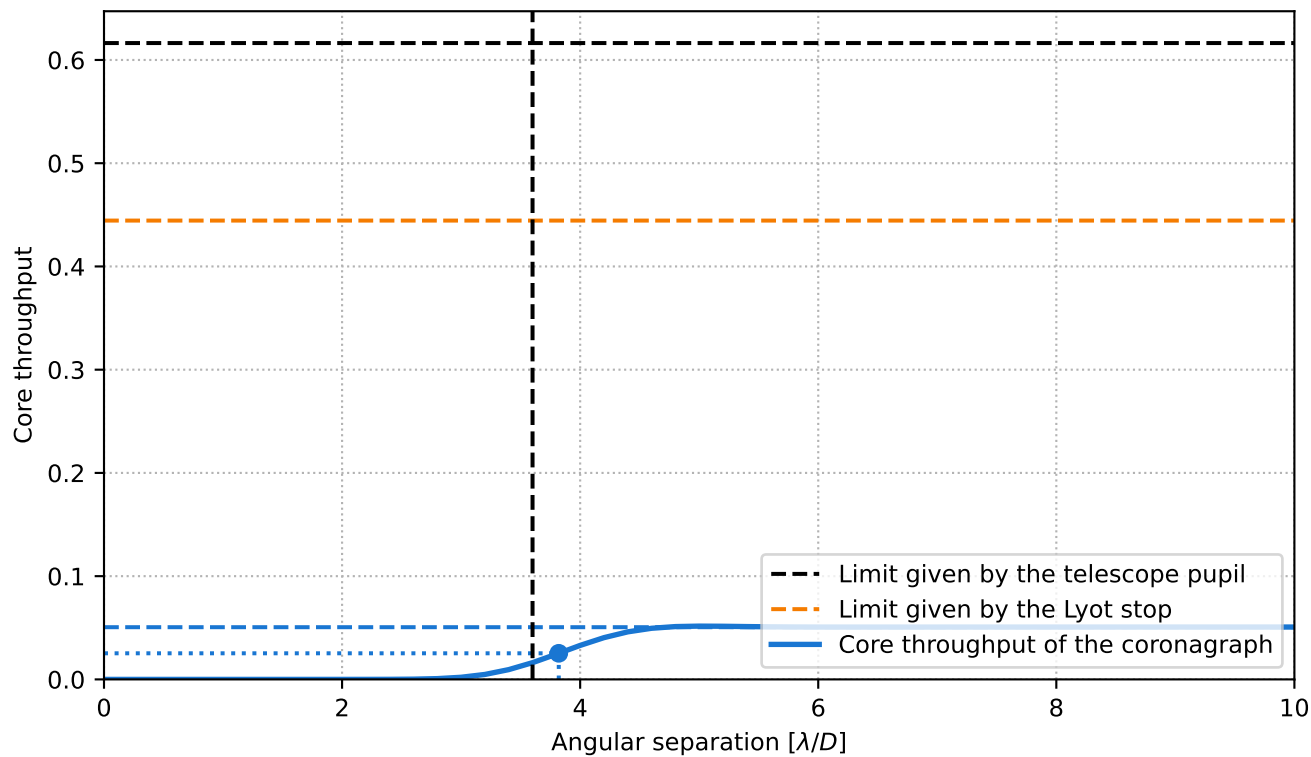


Lyot plane  
w/lyot stop



Final image plane

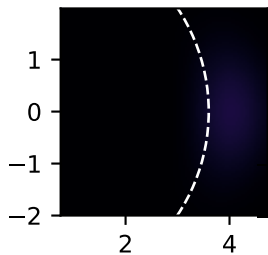




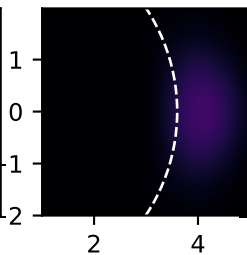
Pupil core throughput:	0.6163835963822561
Lyot stop core throughput:	0.444429515374317
Maximum core throughput:	0.050562425871691866
Maximum core throughput w.r.t. pupil core throughput:	0.08203077786050474
Maximum core throughput w.r.t. Lyot stop core throughput:	0.1137692797678077
Inner working angle:	3.820297736808974 $\lambda_0/D$



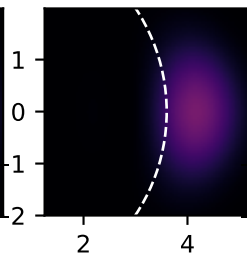
$2.75 \lambda_0/D$



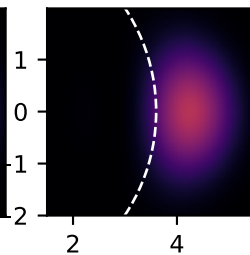
$3.00 \lambda_0/D$



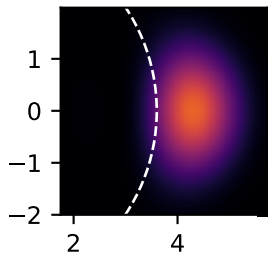
$3.25 \lambda_0/D$



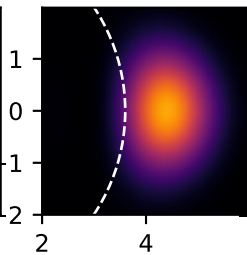
$3.50 \lambda_0/D$



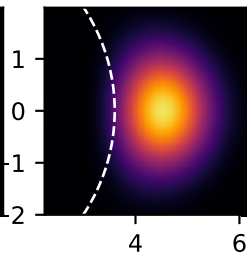
$3.75 \lambda_0/D$



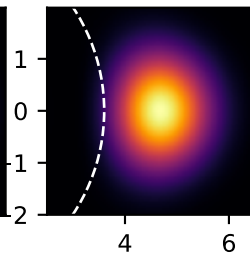
$4.00 \lambda_0/D$



$4.25 \lambda_0/D$

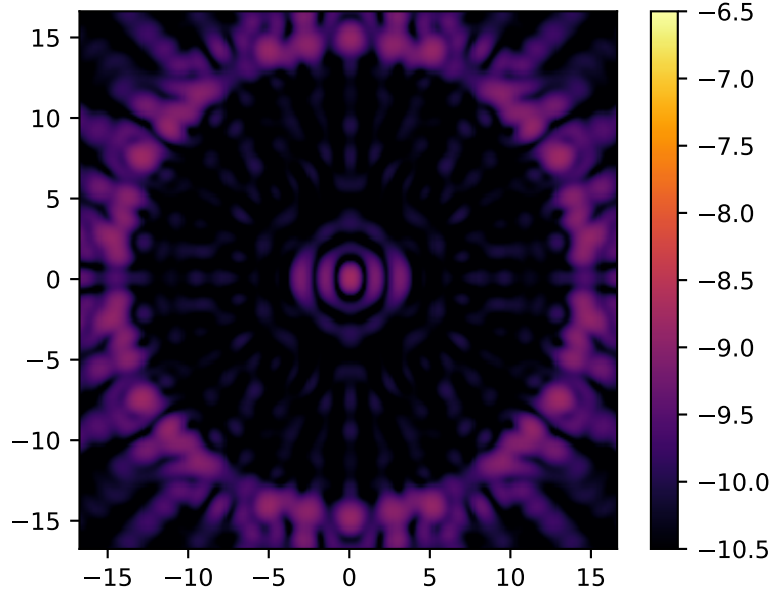


$4.50 \lambda_0/D$

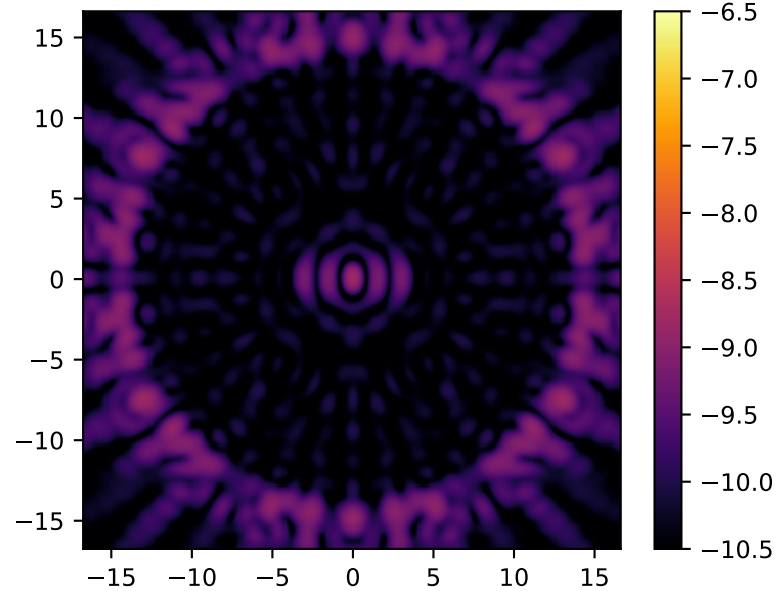


Broadband normalized irradiance for four representative levels of residual pointing jitter.

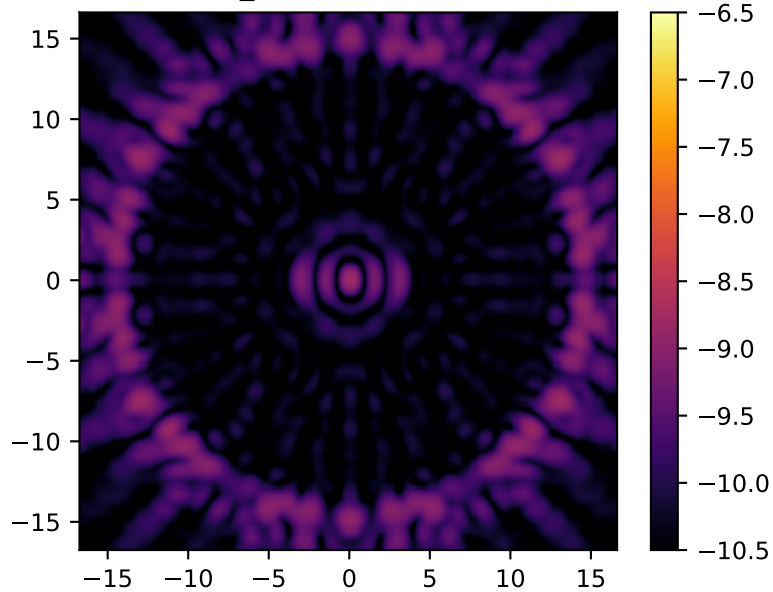
$\sigma_{\text{rms}} = 0.01 \lambda/D$



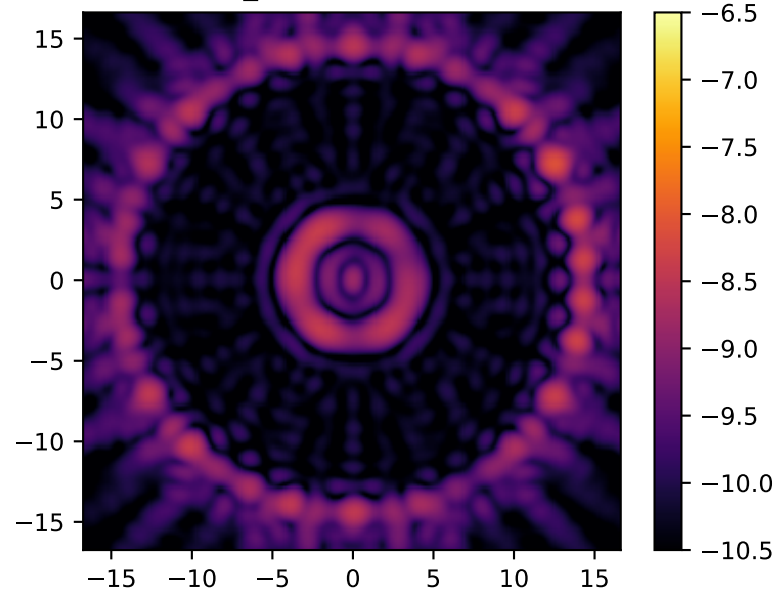
$\sigma_{\text{rms}} = 0.03 \lambda/D$

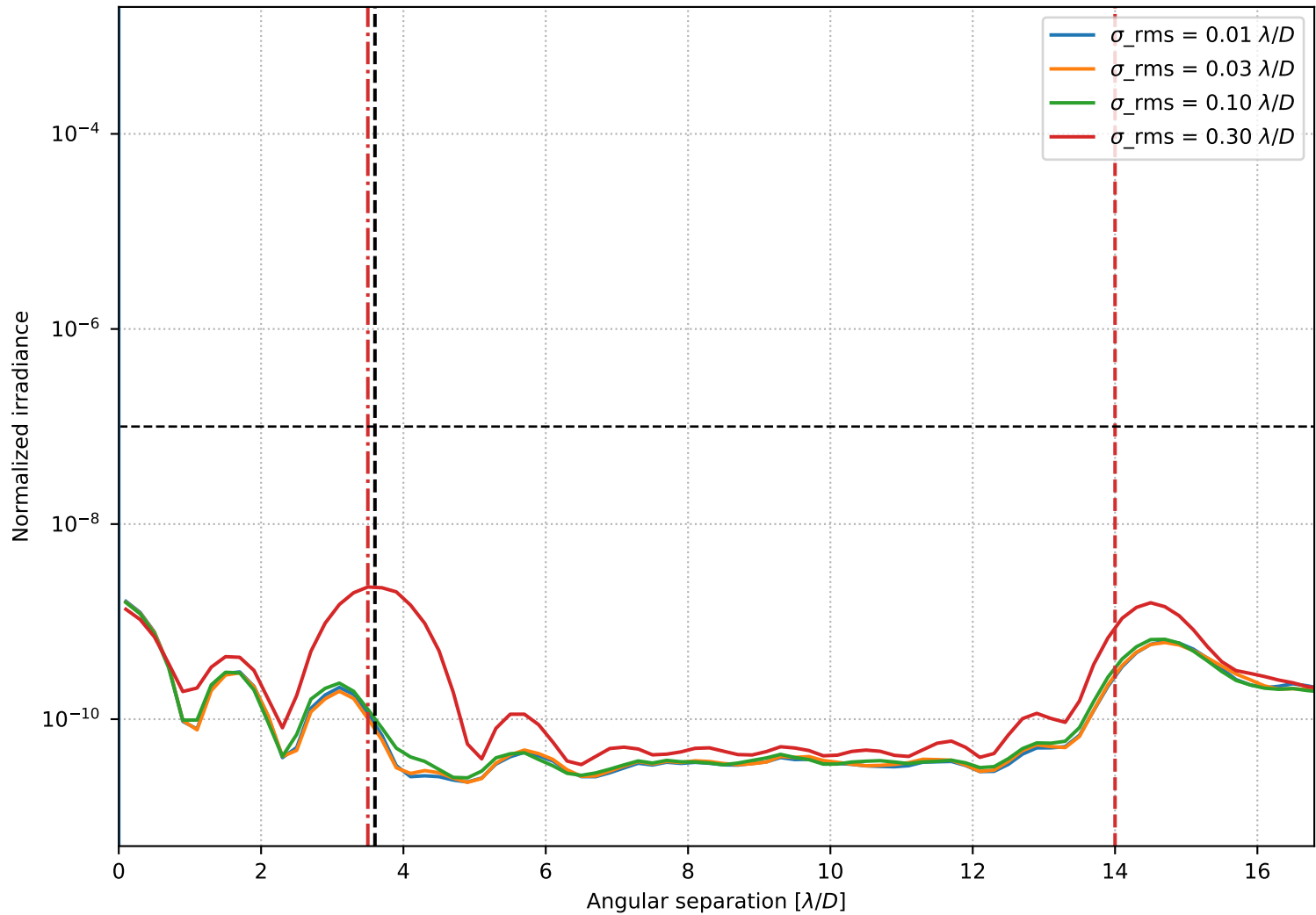


$\sigma_{\text{rms}} = 0.10 \lambda/D$



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





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