

## APLC Design Summary

Instrument	SCDA
nPup	500 x 500 pixels
Coronagraphic throughput (transmitted energy)	0.0536
Core throughput (encircled energy)	0.0675
Lytot stop inner diameter (% of inscribed circle)	0.12
Lytot stop outer diameter (% of inscribed circle)	0.982
Bandpass	10.0%
# wavelengths	3
FPM radius (grayscale)	3.5 $\lambda$ /D
nFPM	150 pixels
IWA — OWA	3.4—12.0 $\lambda$ /D
Contrast constraint	$10^{-10}$
Lytot Stop alignment tolerance	0 pixels

### Input Files :

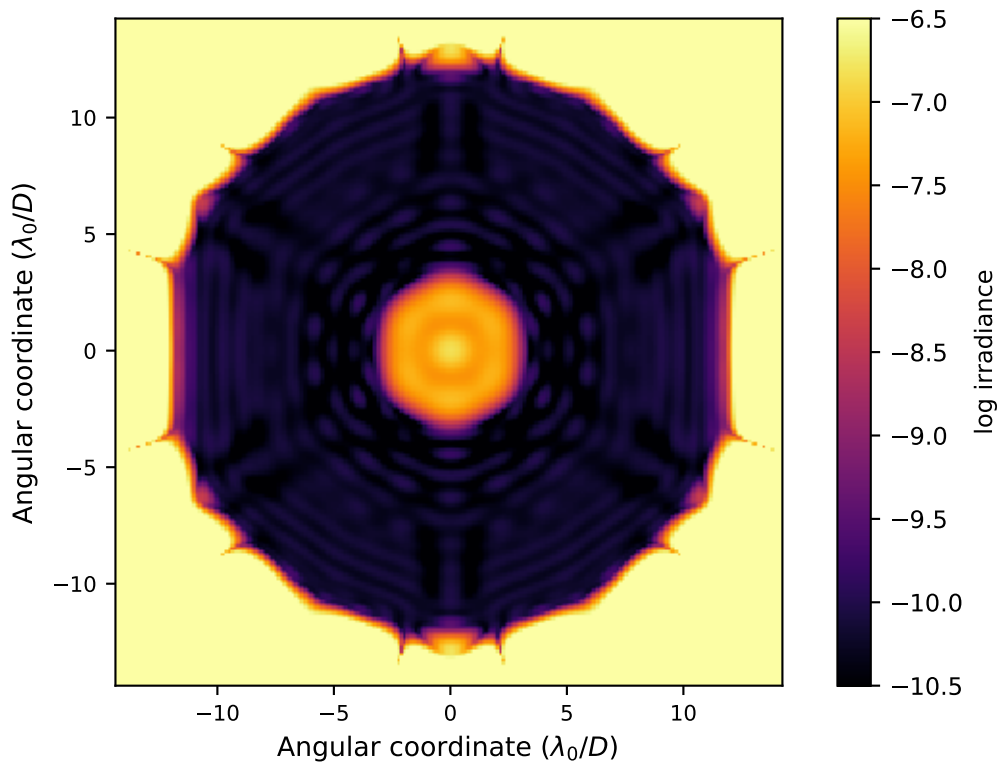
▷ Pupil file : SCDA/TelAp\_SCDA\_12-Hex\_clipped\_gy\_gap\_pad02\_ovsamp03\_N0500.fits

▷ Lyot stop file : SCDA/LS\_SCDA\_ID0120\_OD0982\_no\_struts\_gy\_ovsamp3\_N0500.fits

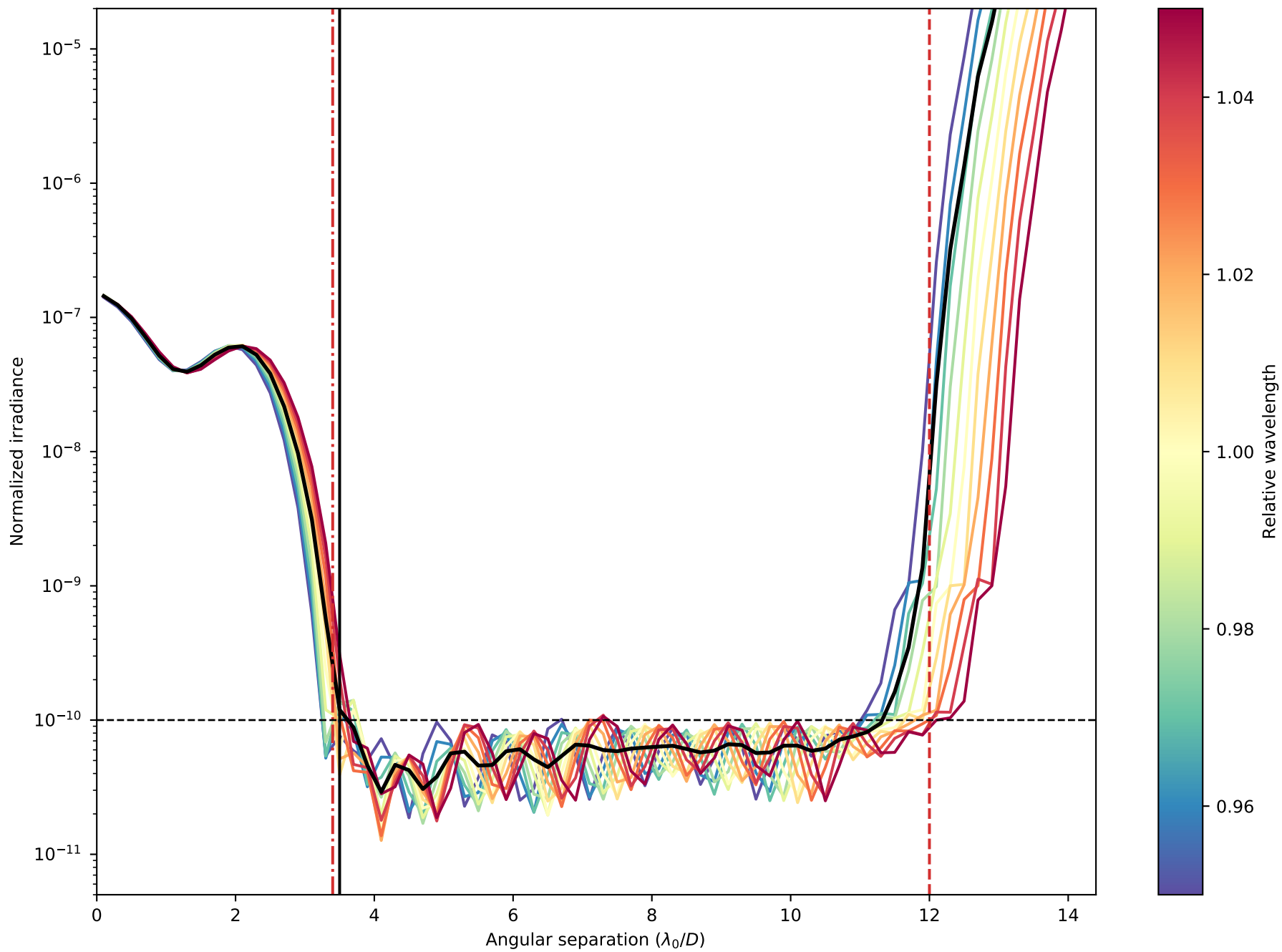
### Solution File :

▷ 09\_SCDA\_N500\_FPM350M0150\_IWA0340\_OWA01200\_C10\_BW10\_NIam3\_LS\_ID0\_OD0\_OD\_no\_ls\_truts\_gy\_ovs.fits

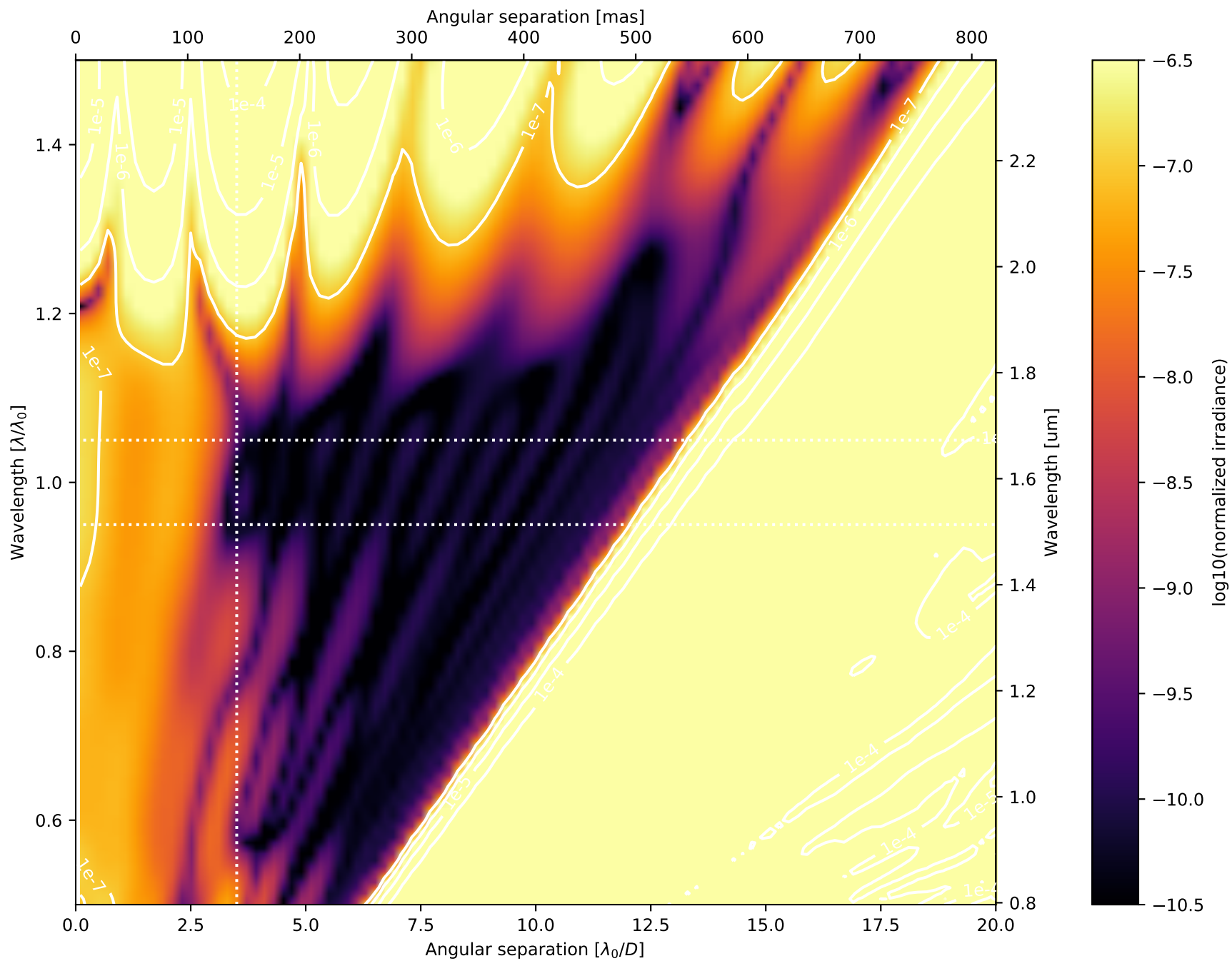
Tue Dec 21 03:45:37 2021

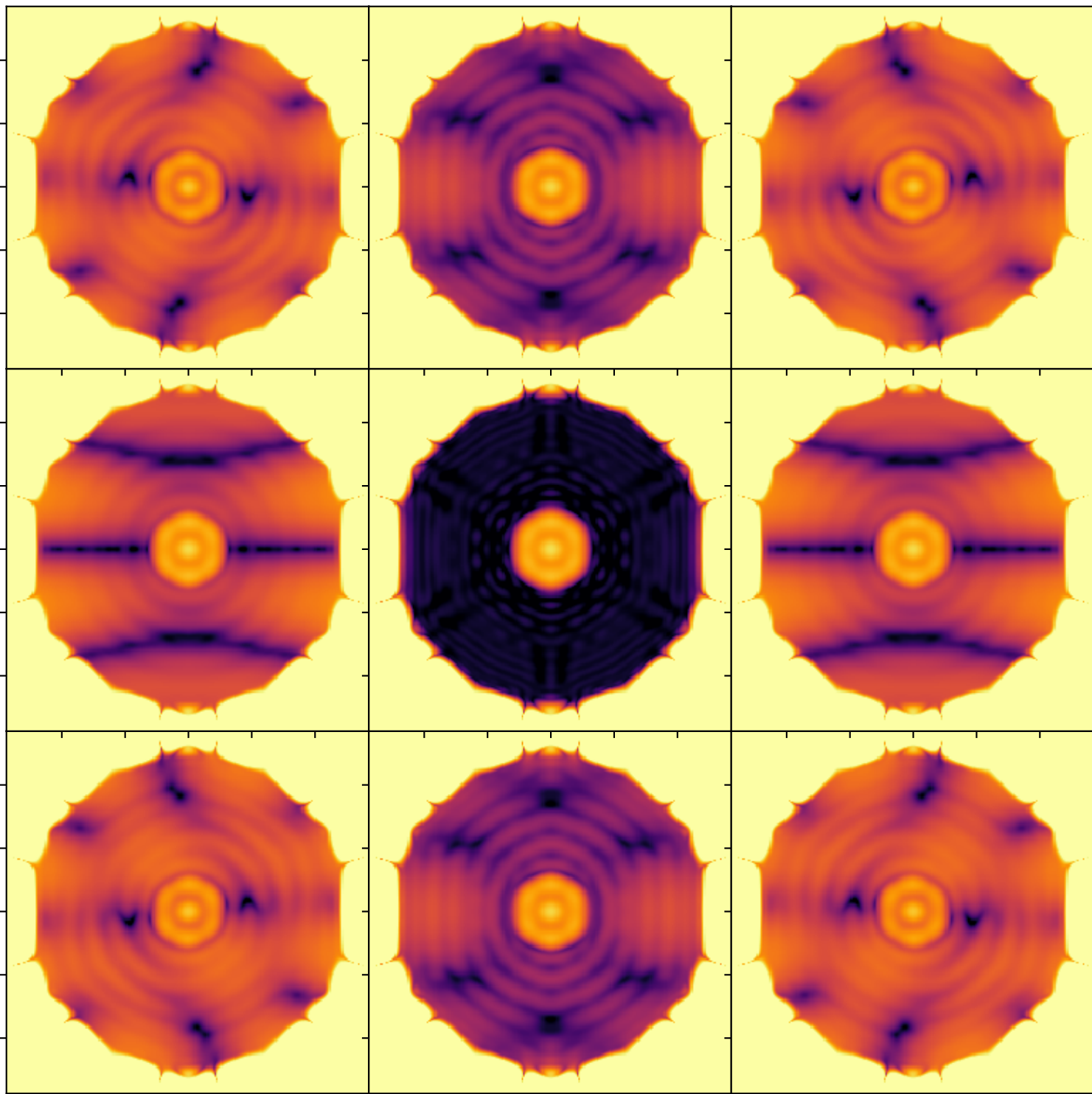


*On – axis PSF in log irradiance,  
normalized to the peak irradiance value.*

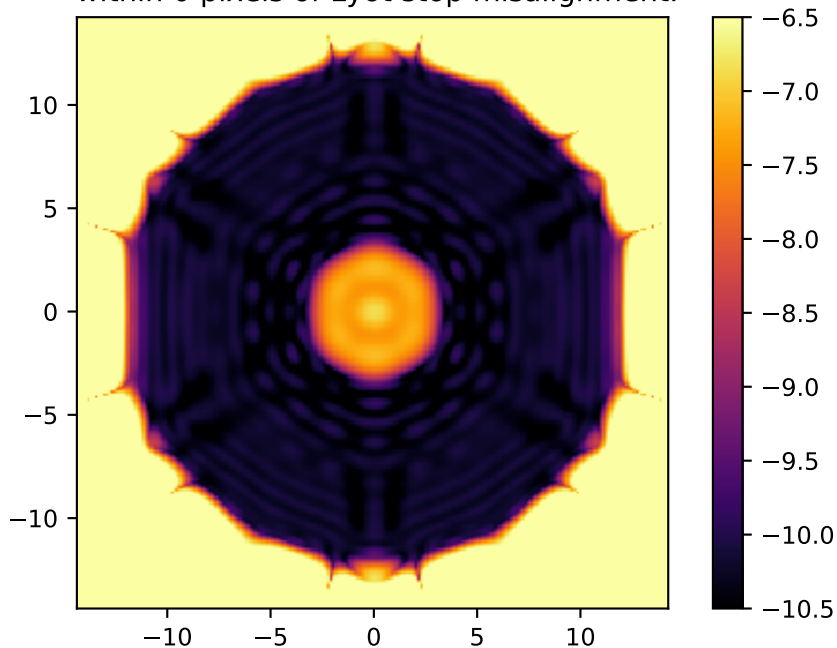


Radial intensity profile for the broadband APLC design at 11 simulated wavelengths centered around  $\lambda_0/D$  and equally spatially sampled over the 10.0% bandpass. The black curve shows the average intensity across the 11 wavelength samples. The dashed red vertical lines delimit the high-contrast dark zone (between  $3.4$  and  $12.0 \lambda_0/D$ ). The blue dotted line delimits the FPM radius, set to  $3.5 \lambda_0/D$ .





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



# Analysis Summary

Apodizer &  
Telescope Aperture

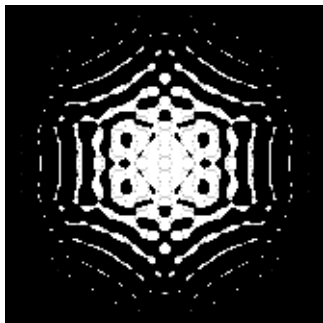


Image plane

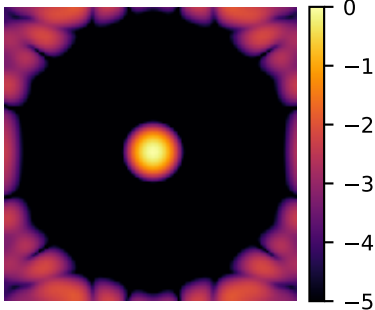
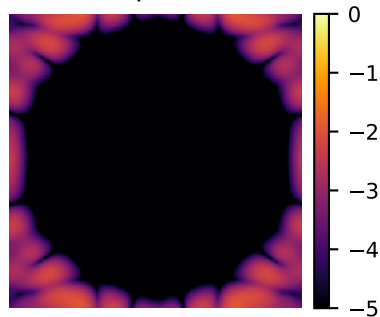
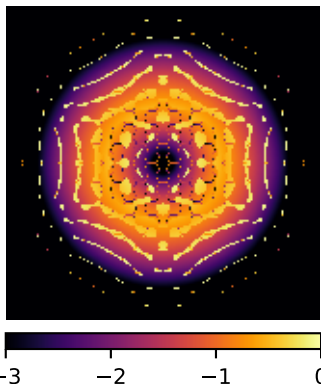


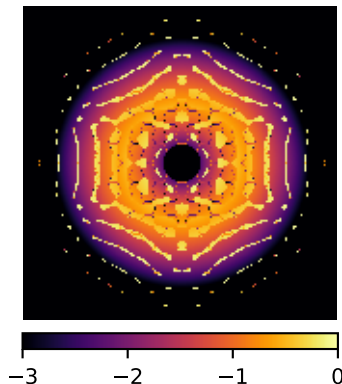
Image plane  
w/FPM



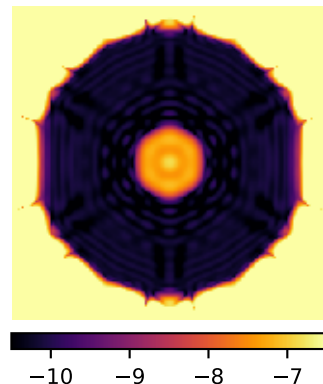
Lyot plane

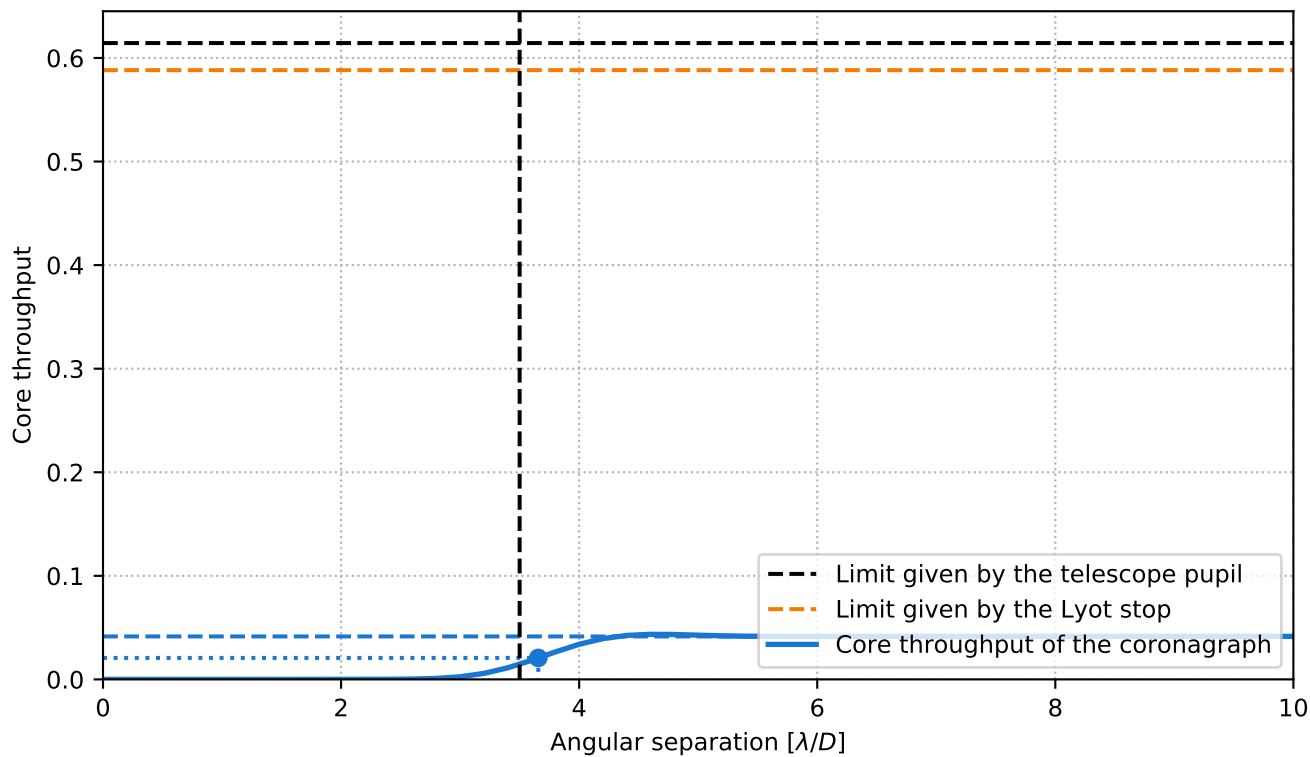


Lyot plane  
w/lyot stop



Final image plane

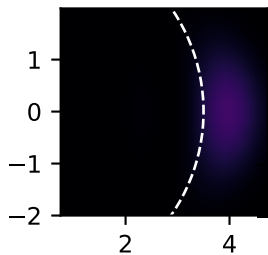




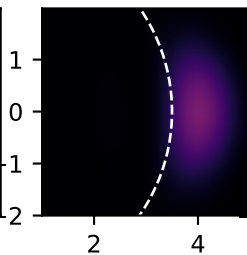
Pupil core throughput:	0.6143960501205463
Lyot stop core throughput:	0.5882390653972921
Maximum core throughput:	0.04147657776909778
Maximum core throughput w.r.t. pupil core throughput:	0.06750788479346498
Maximum core throughput w.r.t. Lyot stop core throughput:	0.07050973015721902
Inner working angle:	3.6566176511666404 $\lambda_0/D$



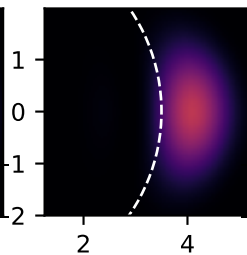
$2.75 \lambda_0/D$



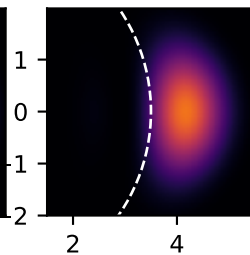
$3.00 \lambda_0/D$



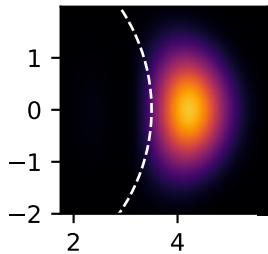
$3.25 \lambda_0/D$



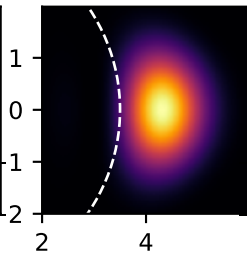
$3.50 \lambda_0/D$



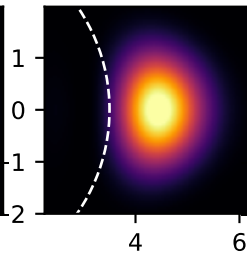
$3.75 \lambda_0/D$



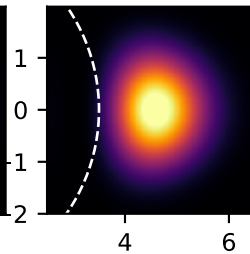
$4.00 \lambda_0/D$



$4.25 \lambda_0/D$

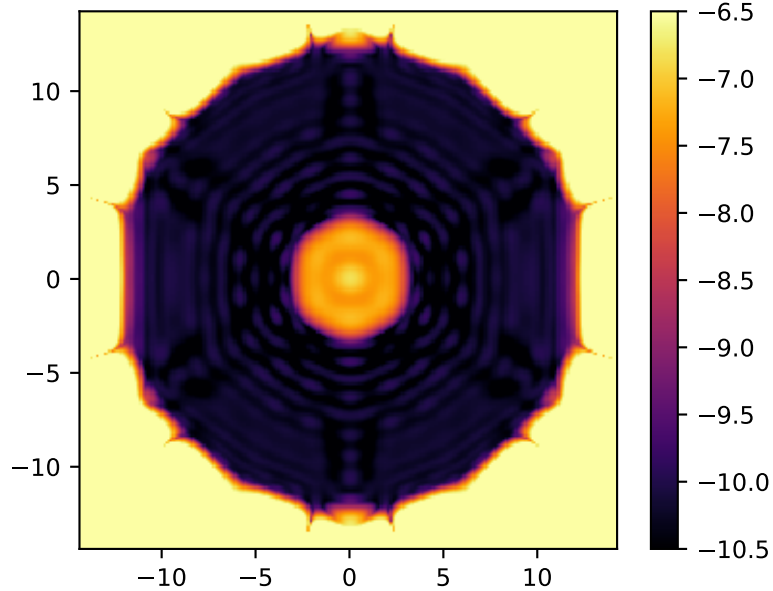


$4.50 \lambda_0/D$

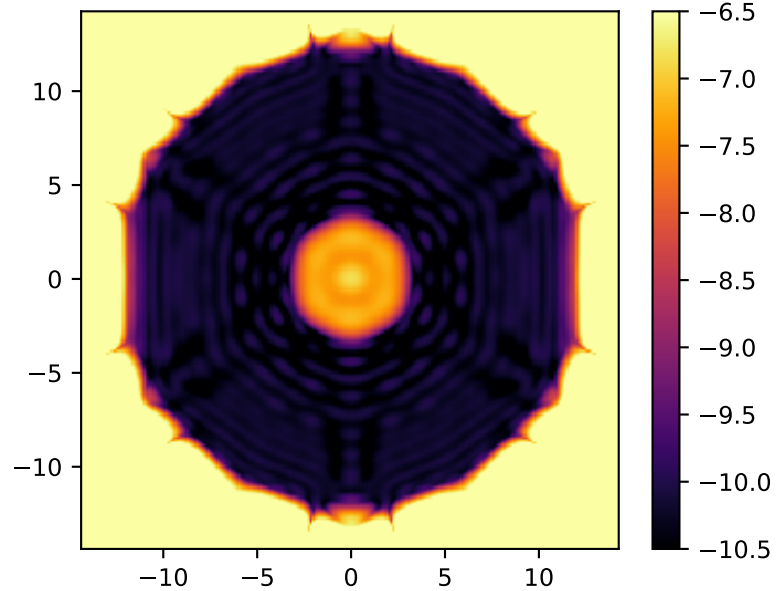


Broadband normalized irradiance for four representative levels of residual pointing jitter.

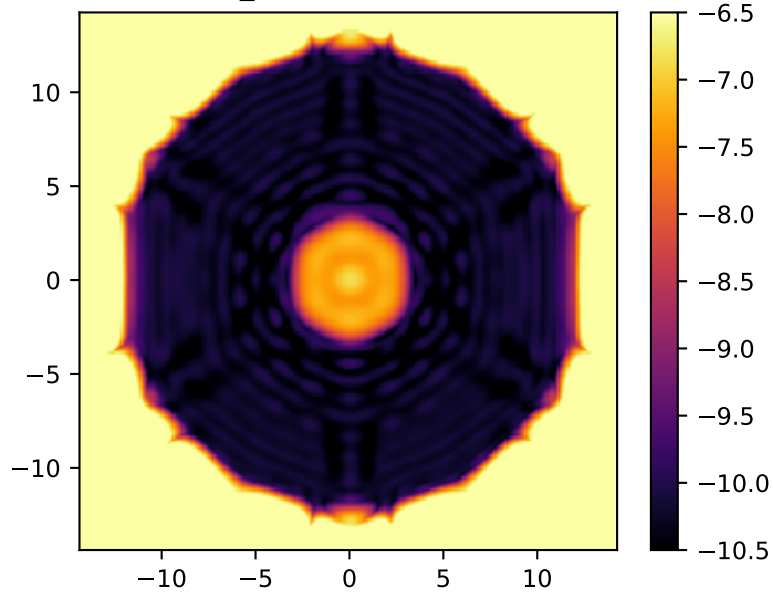
$\sigma_{\text{rms}} = 0.01 \lambda/D$



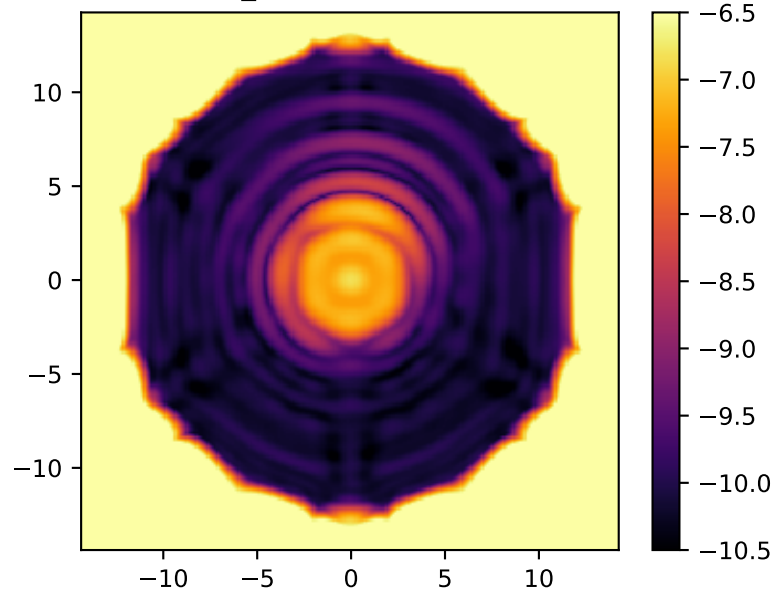
$\sigma_{\text{rms}} = 0.03 \lambda/D$

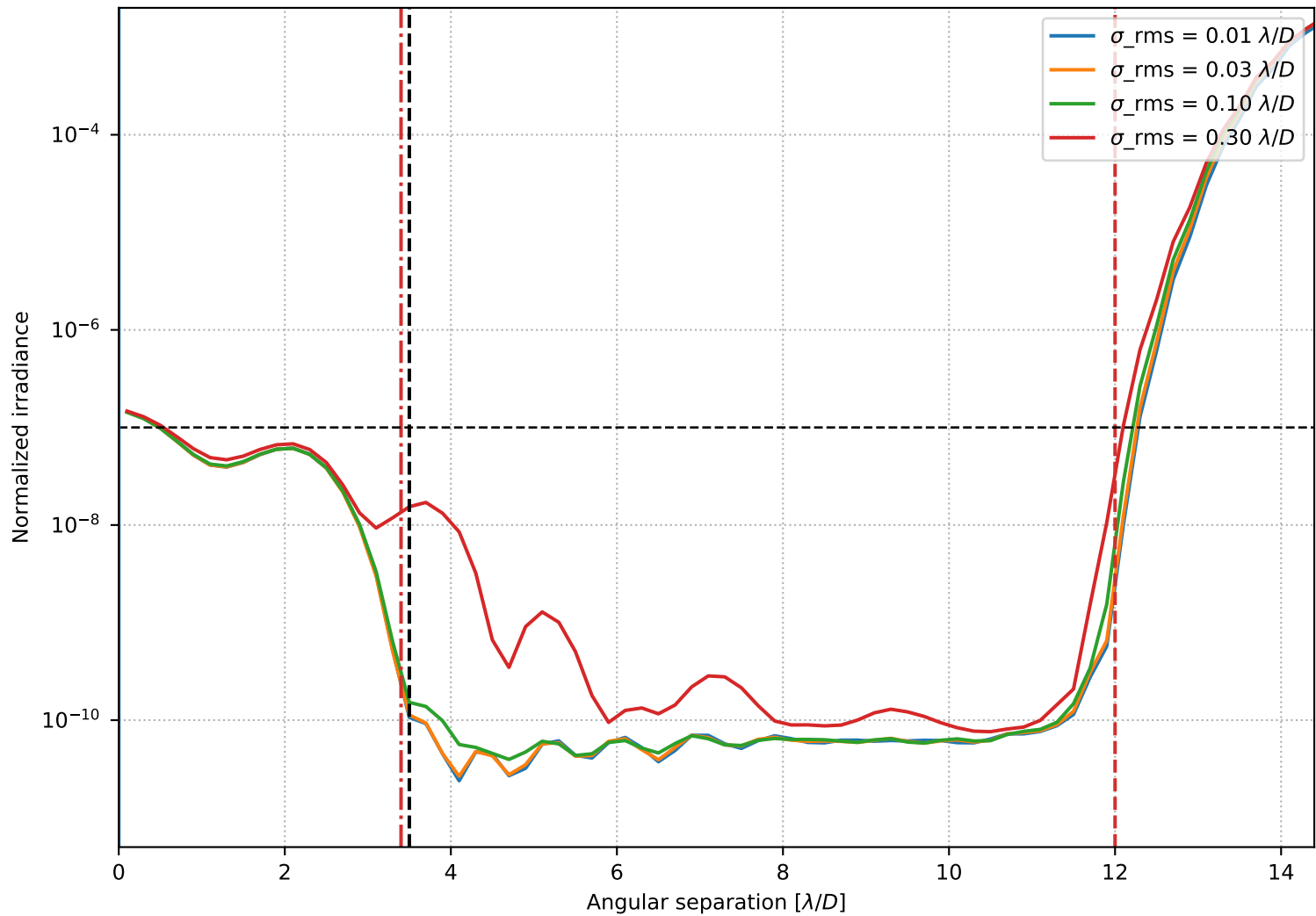


$\sigma_{\text{rms}} = 0.10 \lambda/D$



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





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