

## APLC Design Summary

Instrument	USORT
nPup	128 x 128 pixels
Coronagraphic throughput (transmitted energy)	0.324
Core throughput (encircled energy)	0.2621
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)	4.0 $\lambda/D$
nFPM	150 pixels
IWA — OWA	3.9—14.0 $\lambda/D$
Contrast constraint	$10^{-10}$
Lyot Stop alignment tolerance	0 pixels

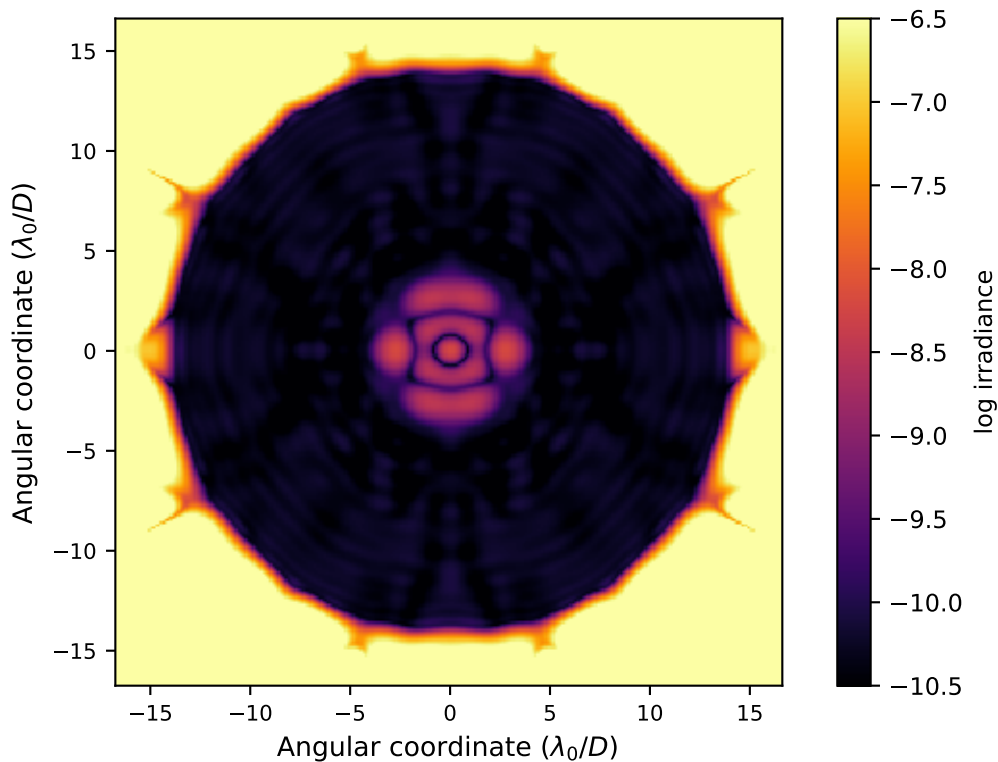
### Input Files:

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

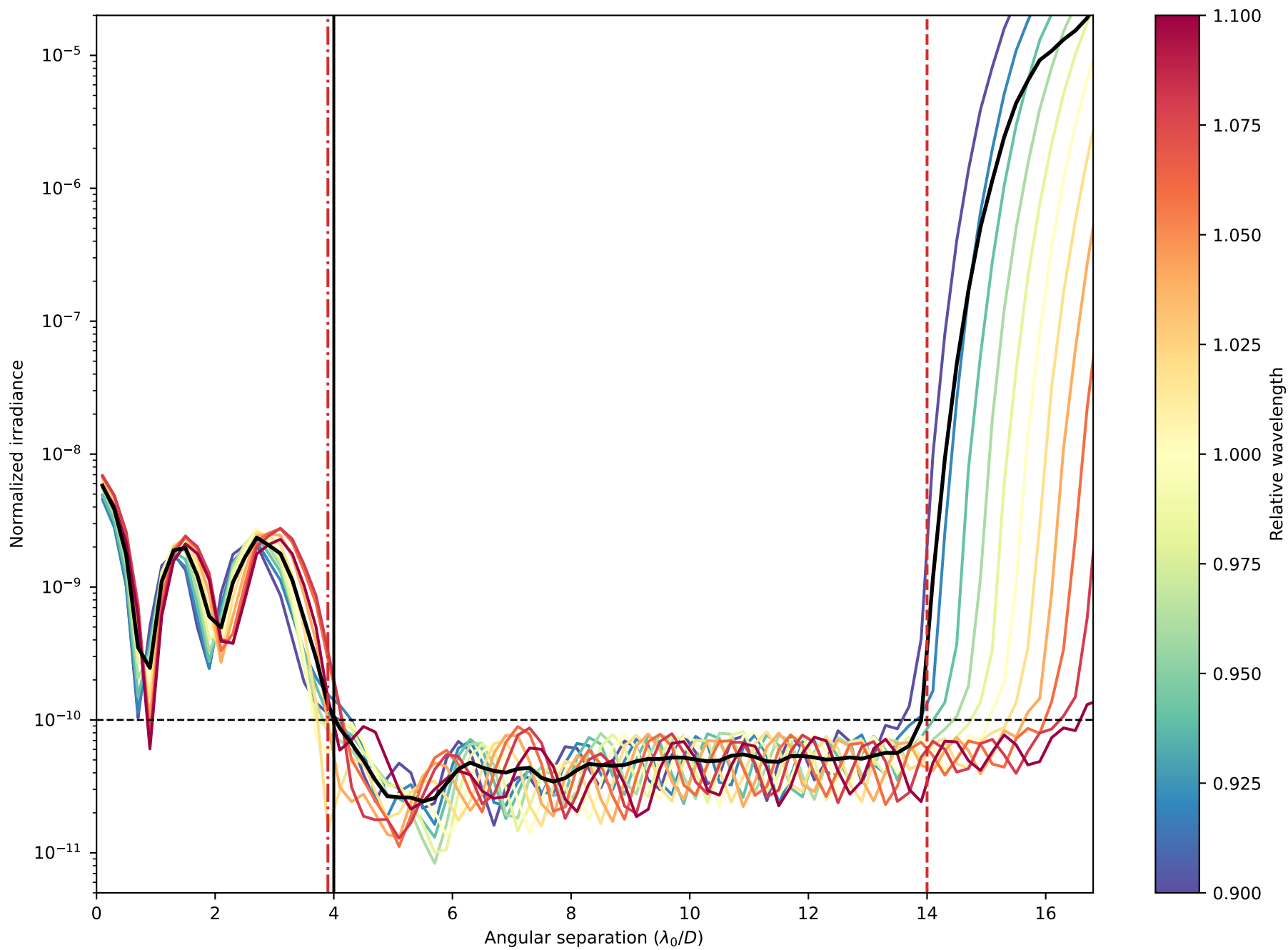
### Solution File:

▷ 08\_USORT\_N128\_FPM400M0150\_IWA0390\_OWA01400\_C10\_BW20\_Nlam5\_LS\_ID00\_ODOD09\_Is\_0\_ovsamp16\_N.fits

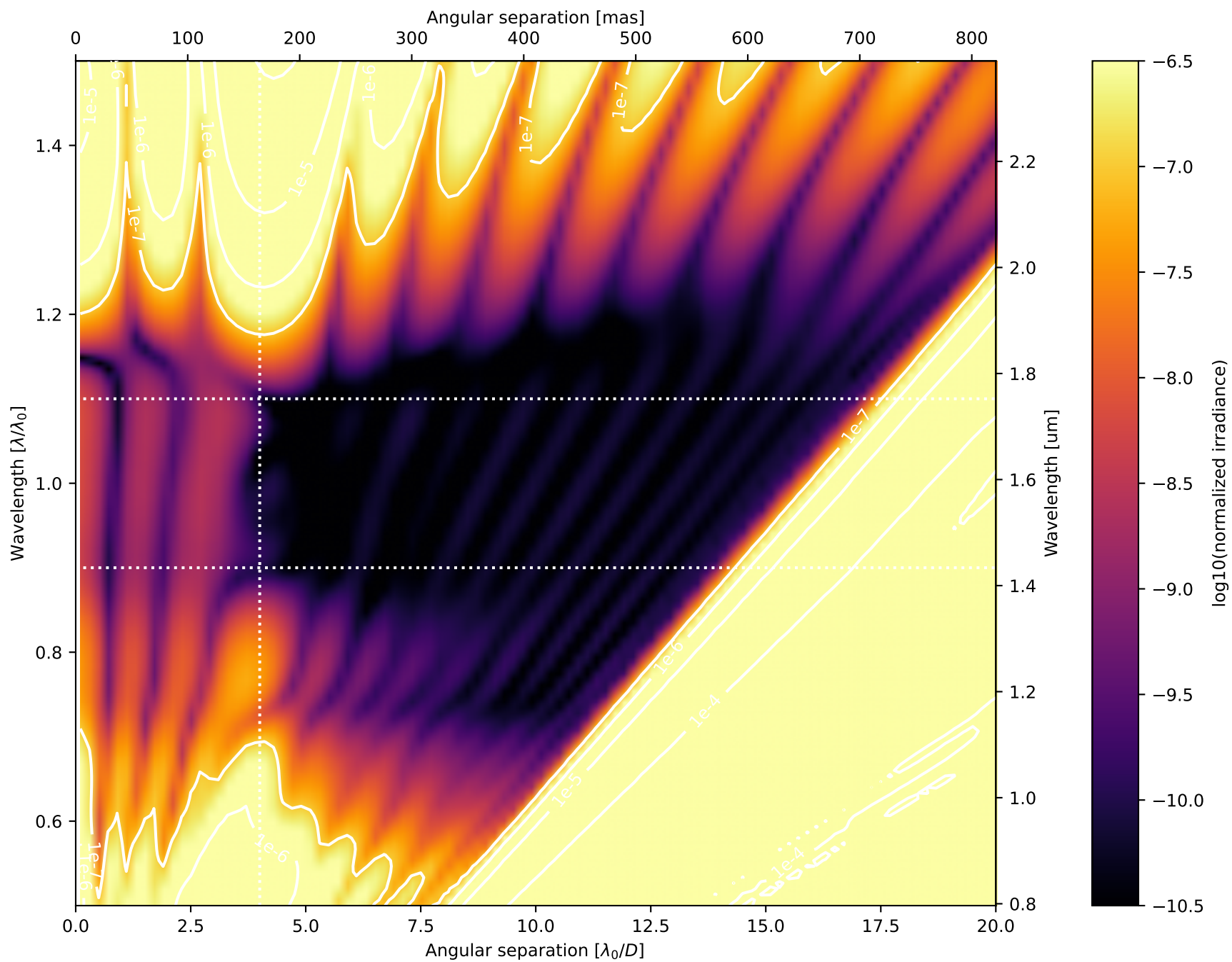
Fri Oct 27 23:31:32 2023

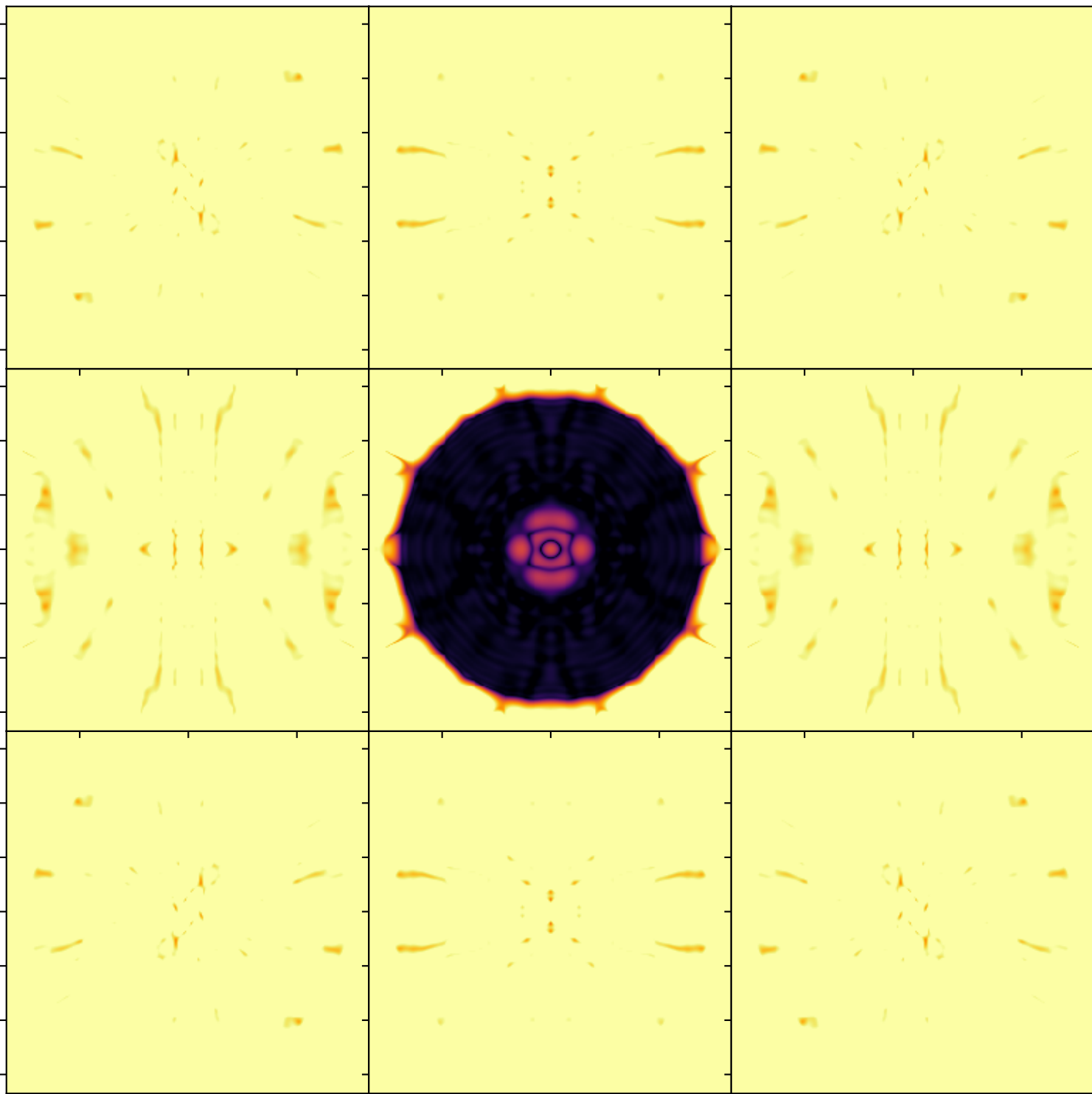


*On – axis PSF in log irradiance,  
normalized to the peak irradiance value.*

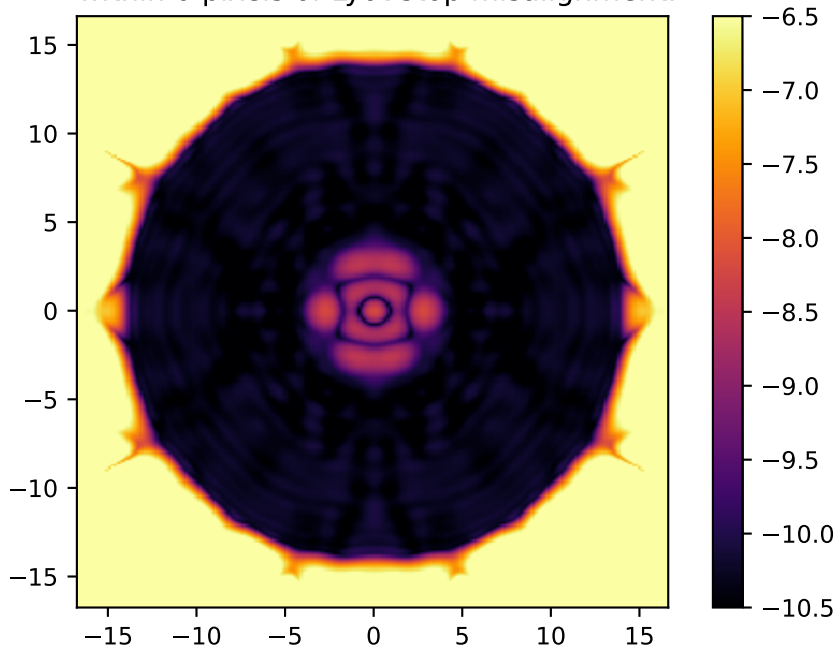


Radial intensity profile for the broadband APLC design at 11 simulated wavelengths centered around  $\lambda_0/D$  and equally spatially sampled over the 20.0% bandpass. The black curve shows the average intensity across the 11 wavelength samples. The dashed red vertical lines delimit the high-contrast dark zone (between  $3.9$  and  $14.0 \lambda_0/D$ ). The blue dotted line delimits the FPM radius, set to  $4.0 \lambda_0/D$ .



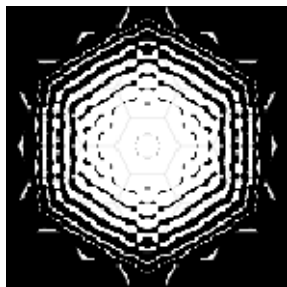


Average broadband normalized irradiance  
within 0 pixels of Lyot stop misalignment.



# Analysis Summary

Apodizer &  
Telescope Aperture



Lyot plane

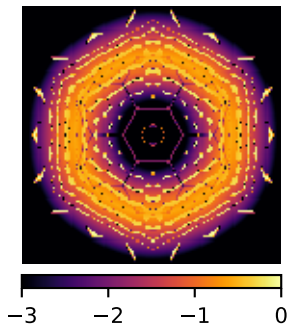
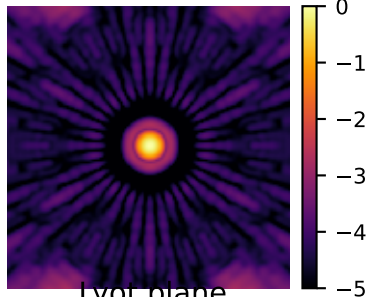


Image plane



Lyot plane  
w/lyot stop

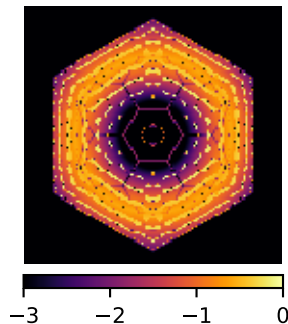
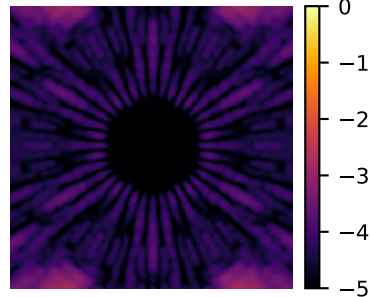
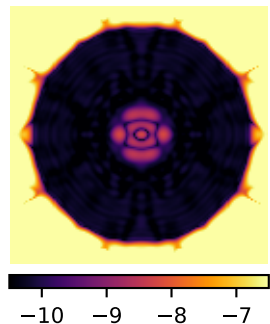
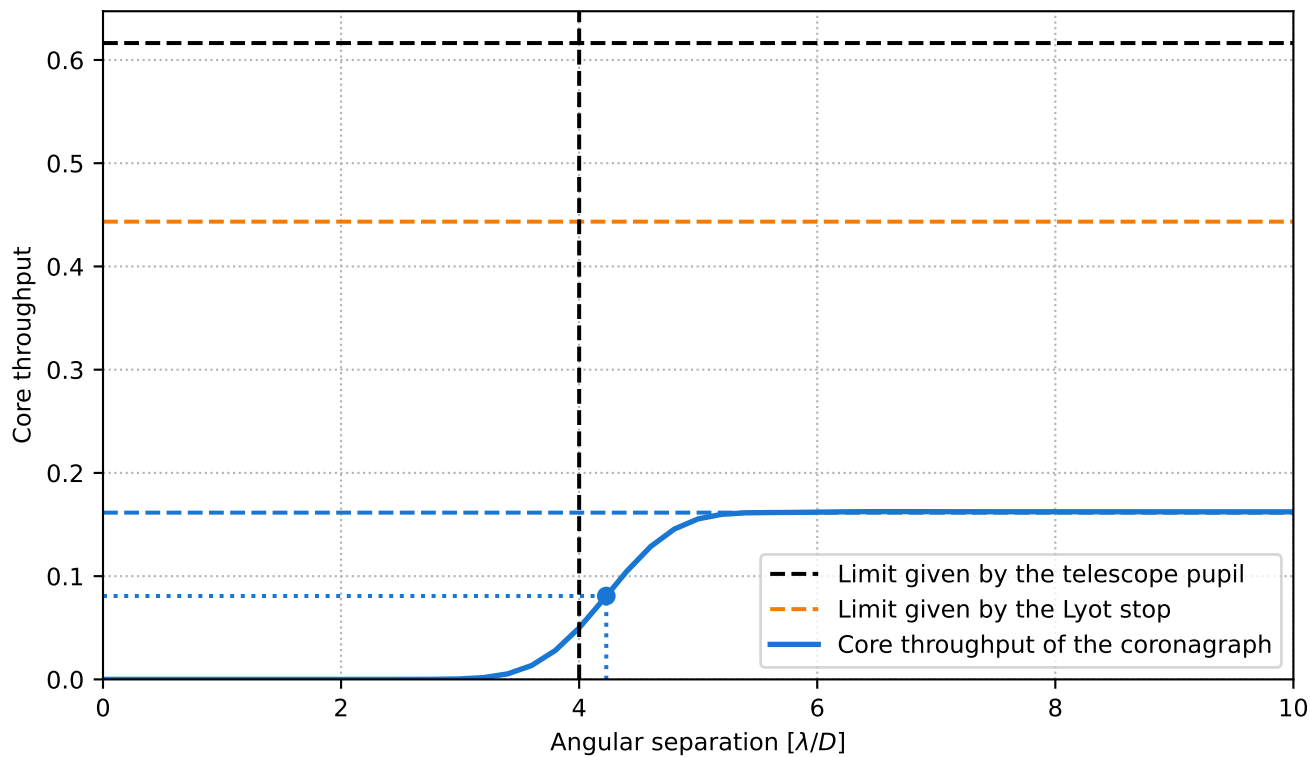


Image plane  
w/FPM



Final image plane

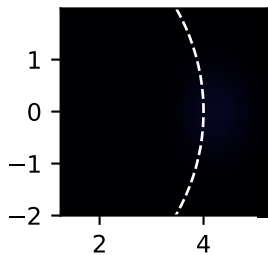




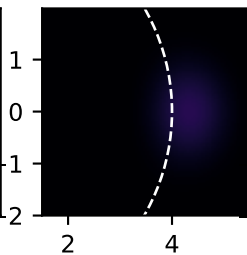
Pupil core throughput:	0.6163835963822561
Lyot stop core throughput:	0.44338273489435265
Maximum core throughput:	0.16153243701224332
Maximum core throughput w.r.t. pupil core throughput:	0.262064788810615
Maximum core throughput w.r.t. Lyot stop core throughput:	0.36431828373004327
Inner working angle:	4.227918707949141 $\lambda_0/D$



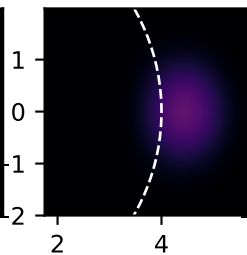
$3.25 \lambda_0/D$



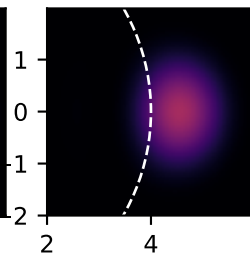
$3.50 \lambda_0/D$



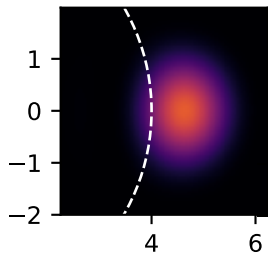
$3.75 \lambda_0/D$



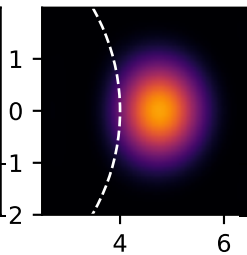
$4.00 \lambda_0/D$



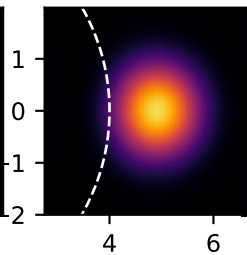
$4.25 \lambda_0/D$



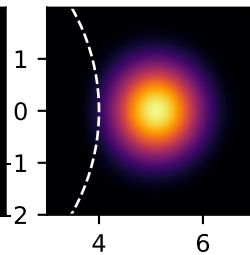
$4.50 \lambda_0/D$



$4.75 \lambda_0/D$

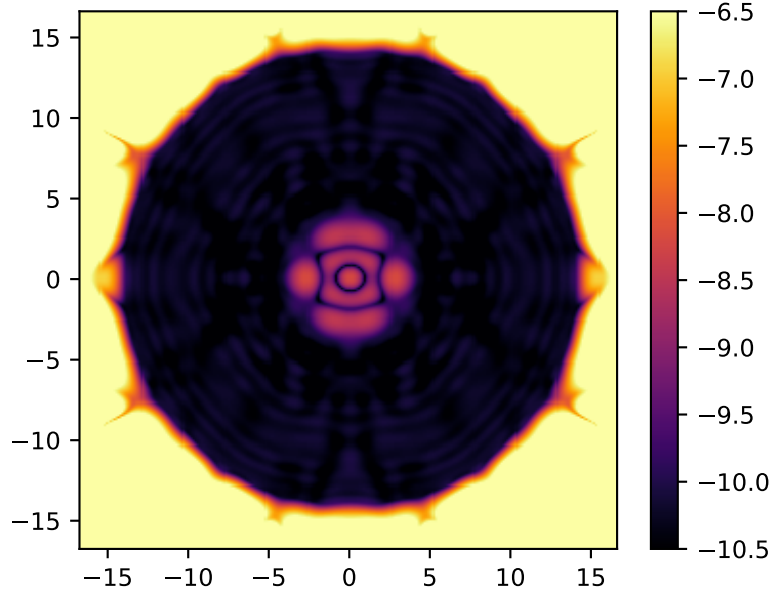


$5.00 \lambda_0/D$

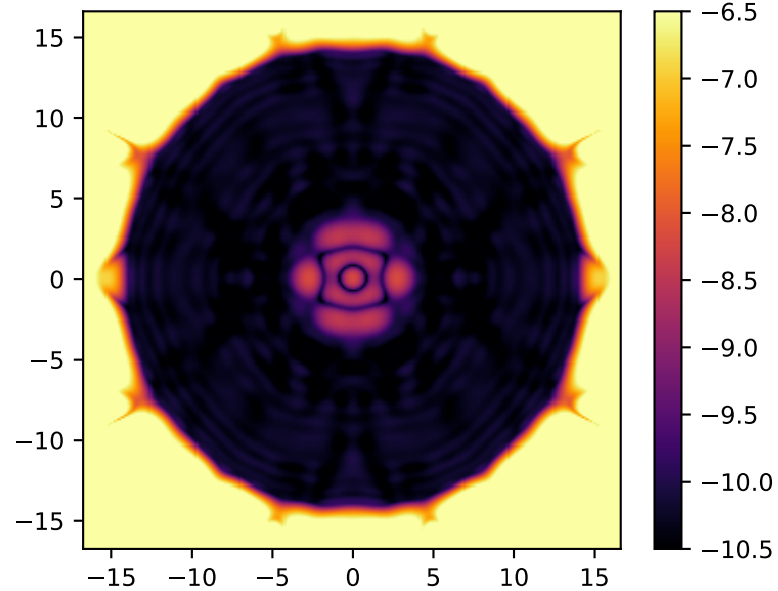


Broadband normalized irradiance for four representative levels of residual pointing jitter.

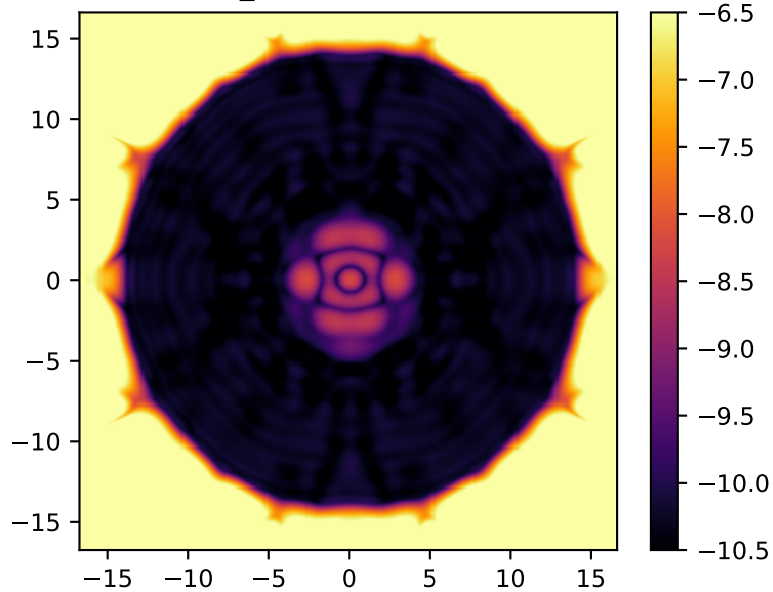
$\sigma_{\text{rms}} = 0.01 \lambda/D$



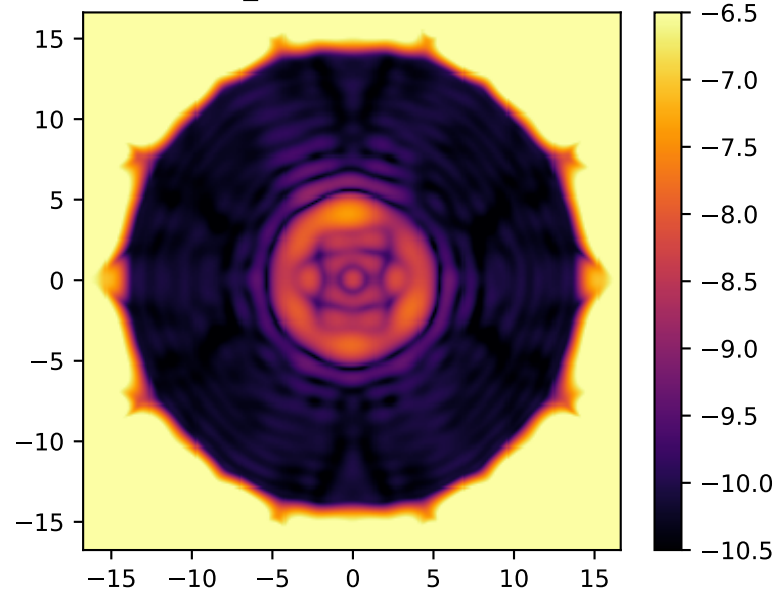
$\sigma_{\text{rms}} = 0.03 \lambda/D$

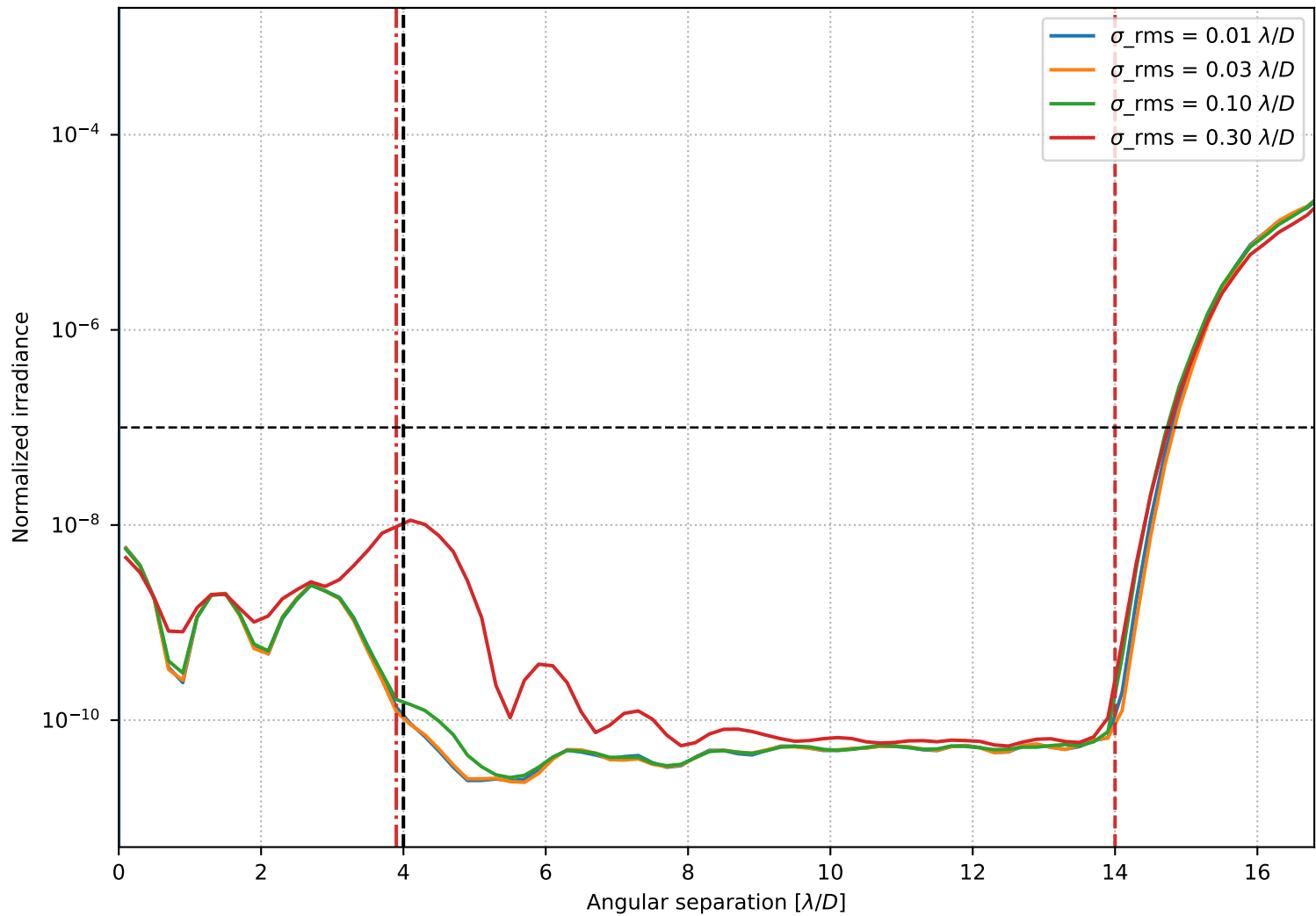


$\sigma_{\text{rms}} = 0.10 \lambda/D$



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





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