

APLC Design Summary

Instrument	USORT
nPup	128 x 128 pixels
Coronagraphic throughput (transmitted energy)	0.0992
Core throughput (encircled energy)	0.0862
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)	3.6 λ/D
nFPM	150 pixels
IWA — OWA	3.5—14.0 λ/D
Contrast constraint	10^{-10}
Lyot Stop alignment tolerance	0 pixels

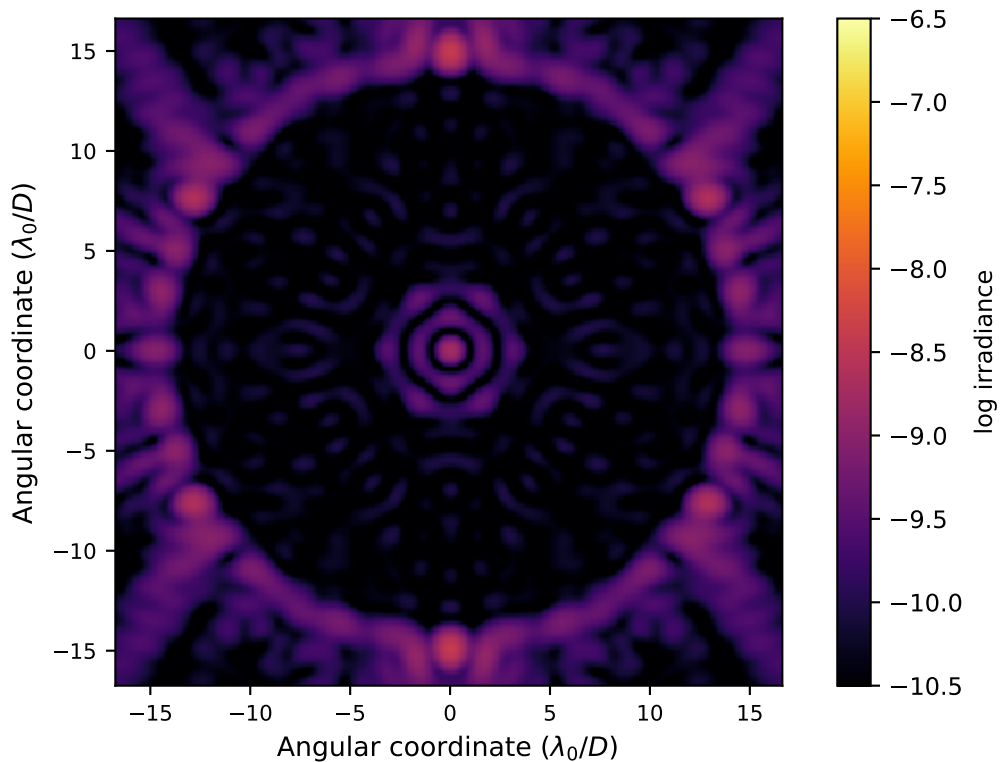
Input Files :

- ▷ Pupil file : USORT/TelAp_USORT_offaxis_ovsamp16_N0128.fits
- ▷ Lyot stop file : USORT/LS_USORT_hex_ID0000_OD0990_ovsamp16_N0128.fits

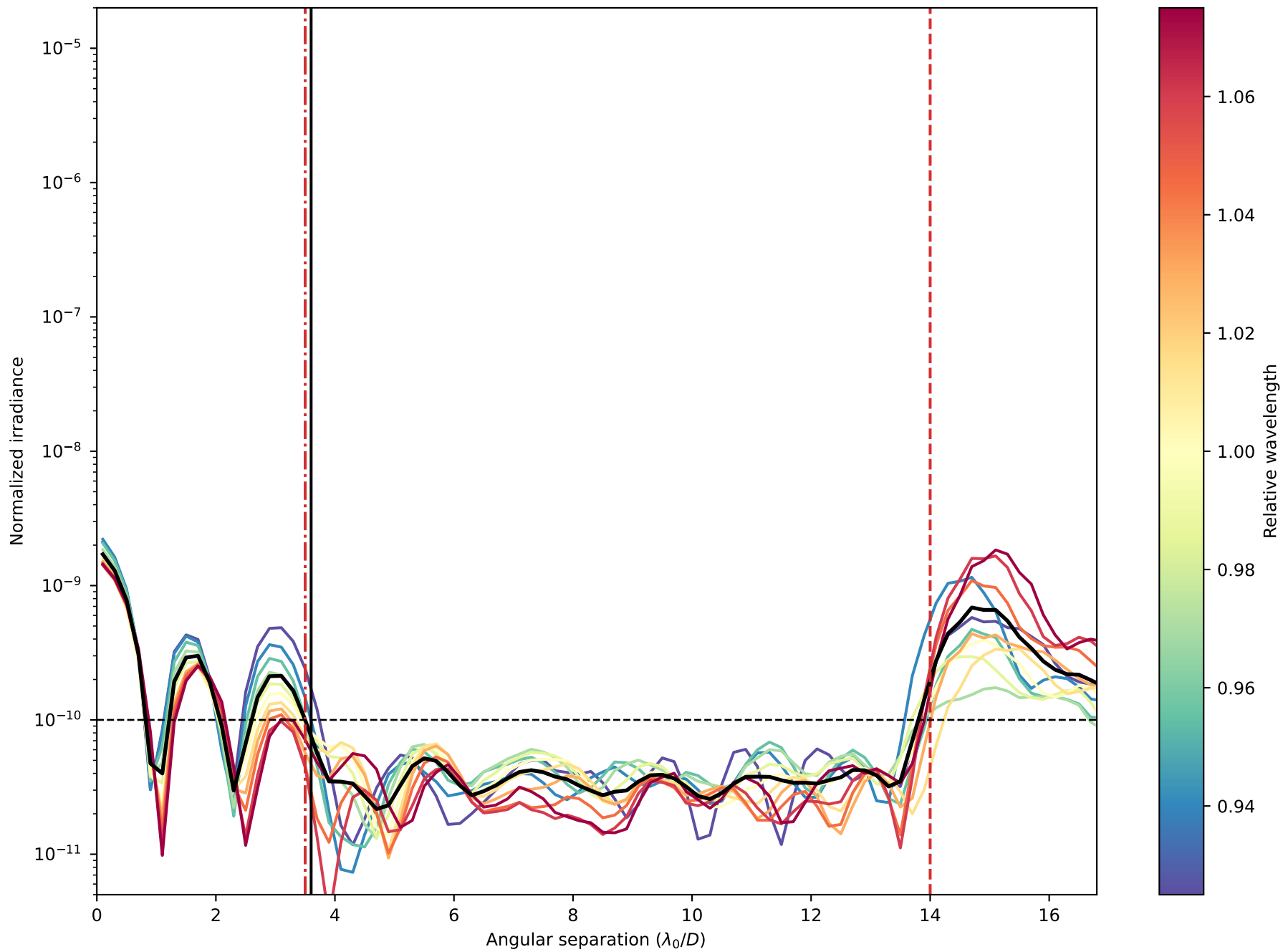
Solution File :

▷ 10_USORT_N128_FPM360M0150_IWA0350_OWA01400_C10_BW15_Nlam5_LS_ID00_ODOD09_Is_0_ovsamp16_N.fits

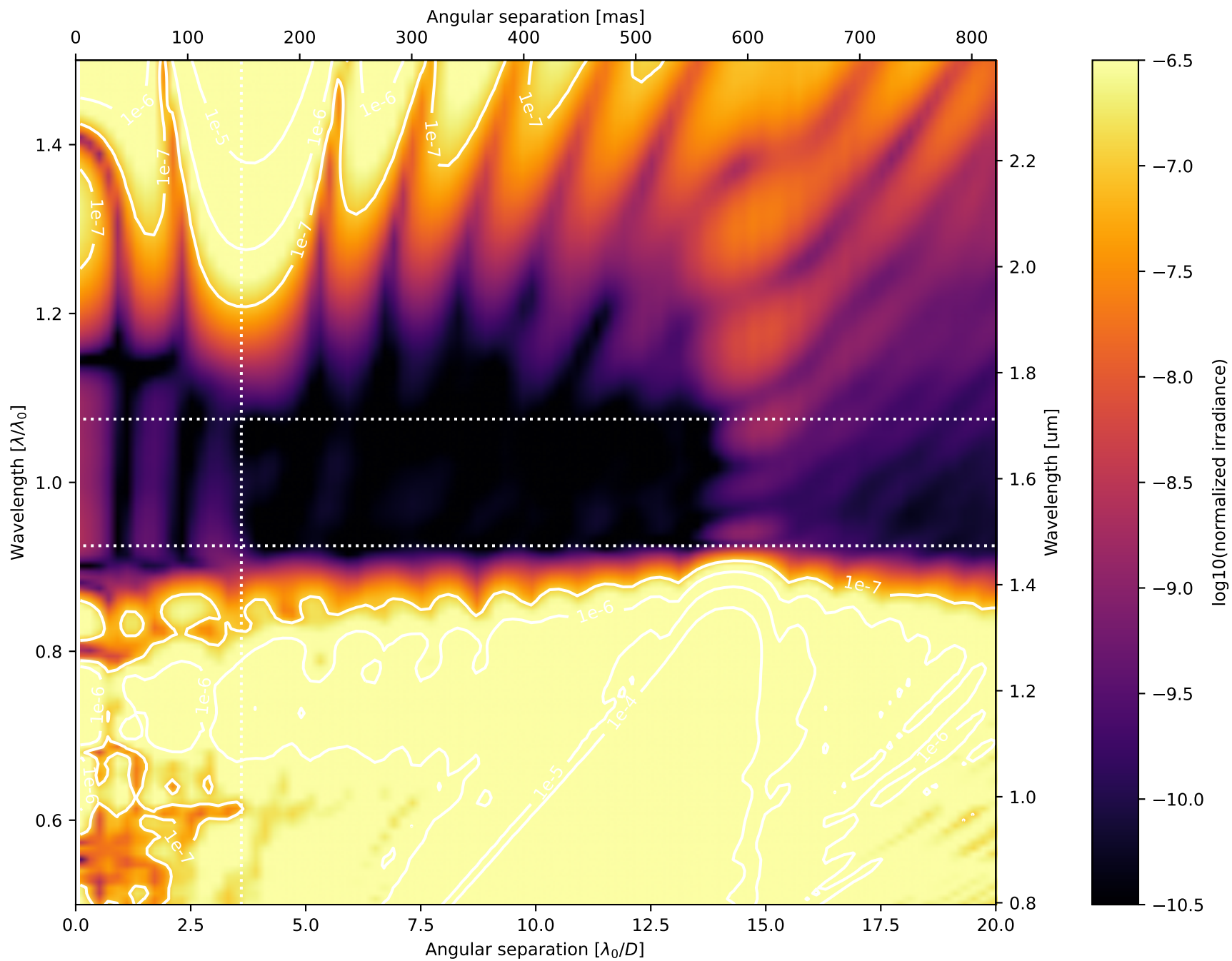
Fri Oct 27 16:48:57 2023

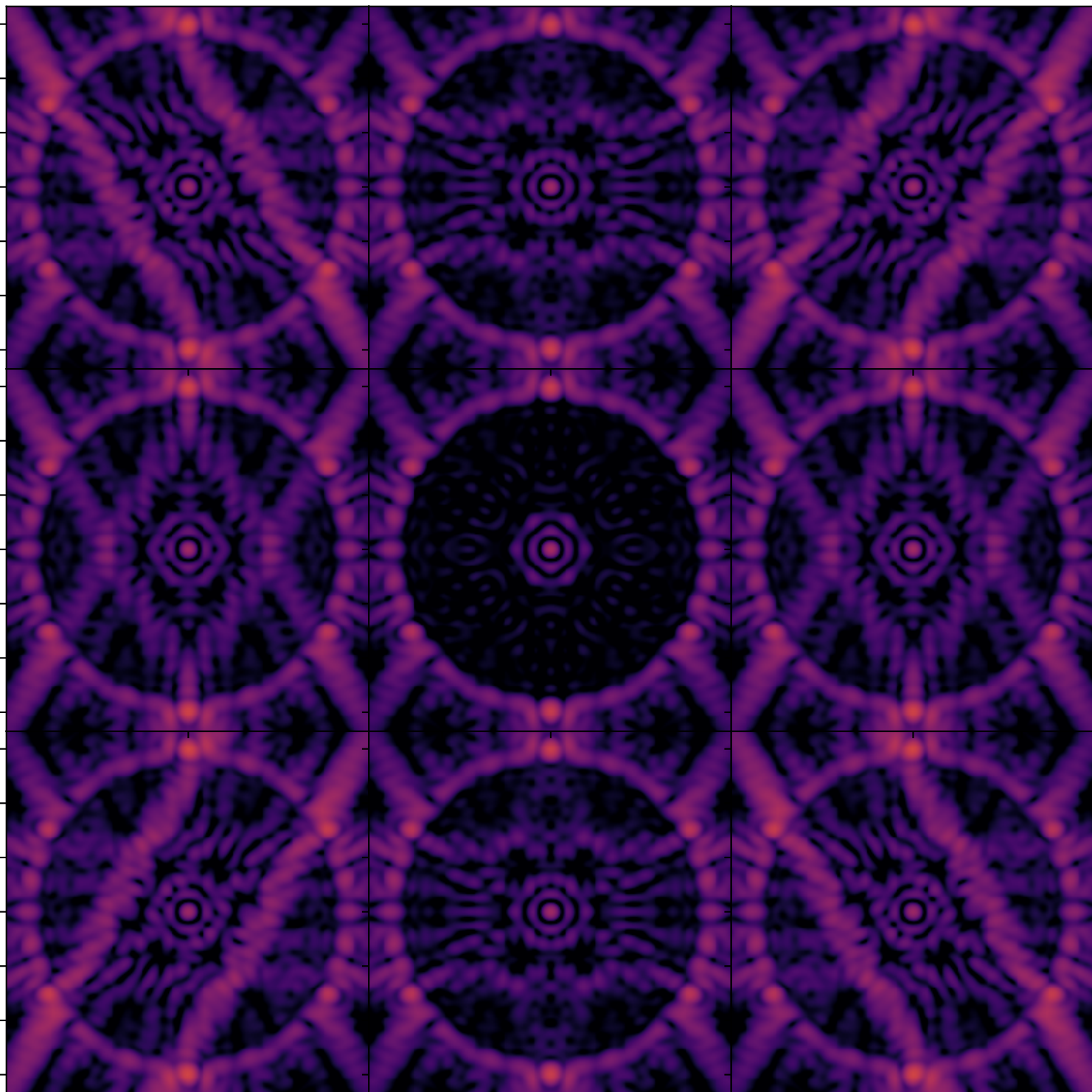


*On – axis PSF in log irradiance,
normalized to the peak irradiance value.*

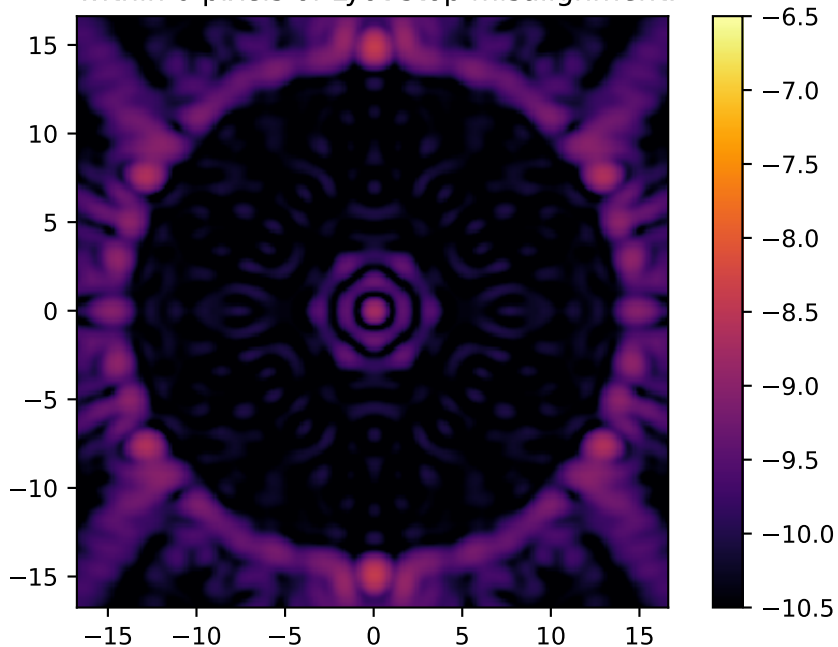


Radial intensity profile for the broadband APLC design at 11 simulated wavelengths centered around λ_0/D and equally spatially sampled over the 15.0% bandpass. The black curve shows the average intensity across the 11 wavelength samples. The dashed red vertical lines delimit the high-contrast dark zone (between 3.5 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

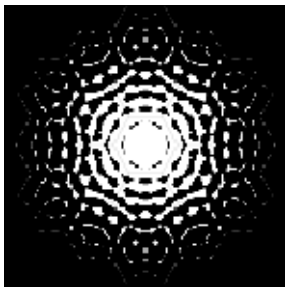


Image plane

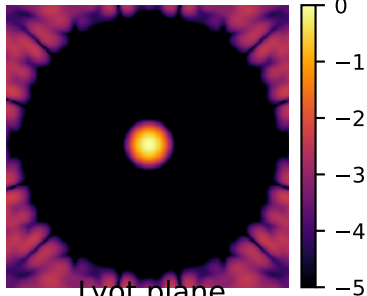
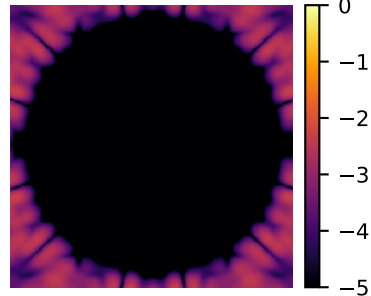
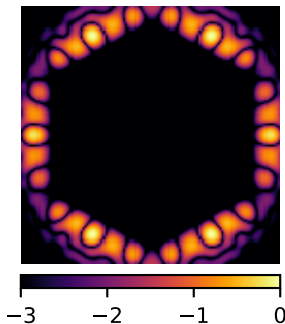


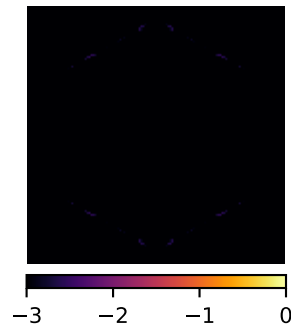
Image plane
w/FPM



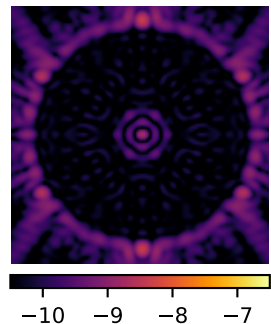
Lyot plane

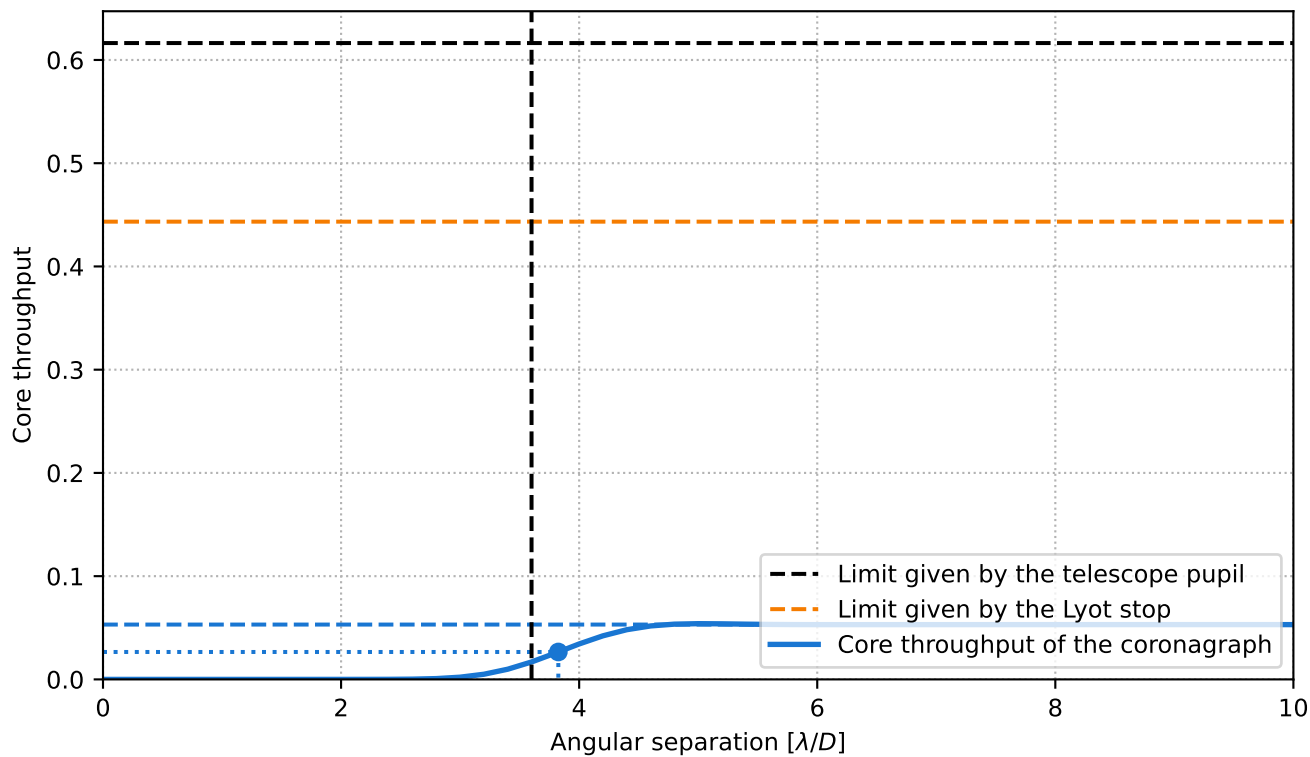


Lyot plane
w/lyot stop



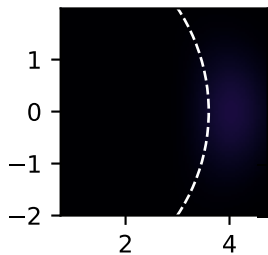
Final image plane



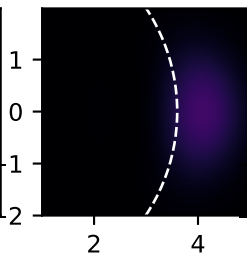


Pupil core throughput:	0.6163835963822561
Lyot stop core throughput:	0.44338273489435265
Maximum core throughput:	0.05311163062904398
Maximum core throughput w.r.t. pupil core throughput:	0.08616652185550099
Maximum core throughput w.r.t. Lyot stop core throughput:	0.1197873224398311
Inner working angle:	3.8250557024209093 λ_0/D

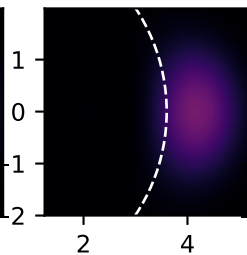
$2.75 \lambda_0/D$



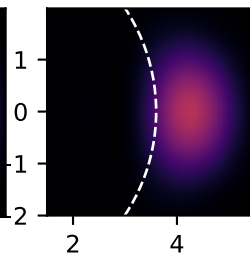
$3.00 \lambda_0/D$



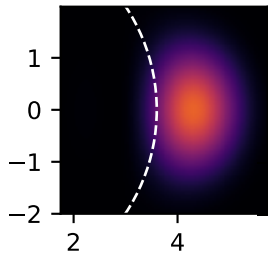
$3.25 \lambda_0/D$



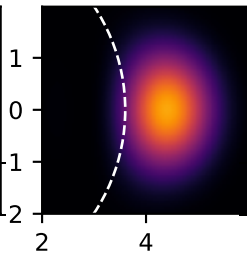
$3.50 \lambda_0/D$



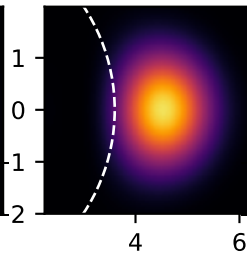
$3.75 \lambda_0/D$



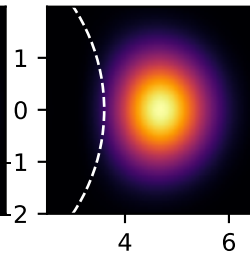
$4.00 \lambda_0/D$



$4.25 \lambda_0/D$

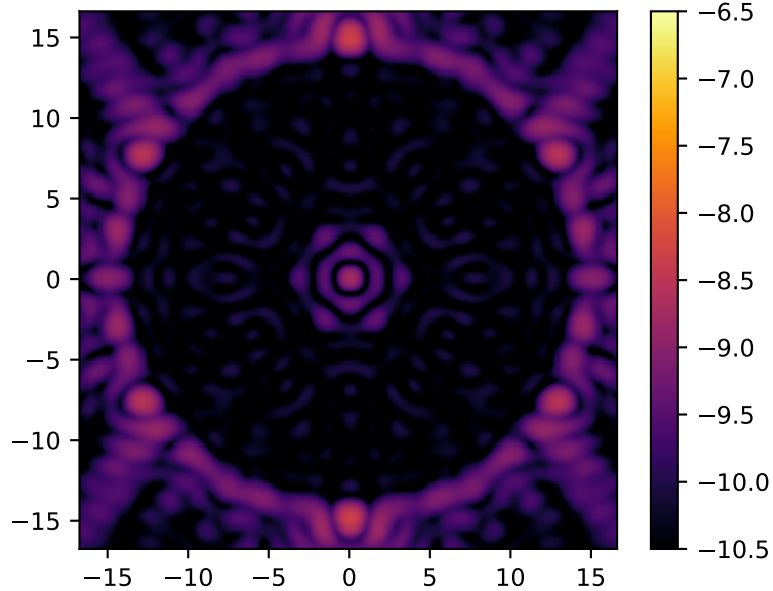


$4.50 \lambda_0/D$

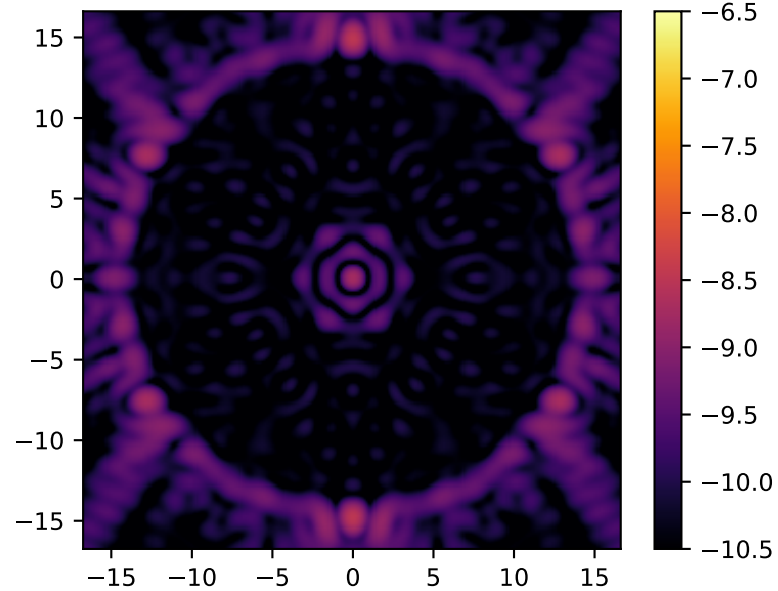


Broadband normalized irradiance for four representative levels of residual pointing jitter.

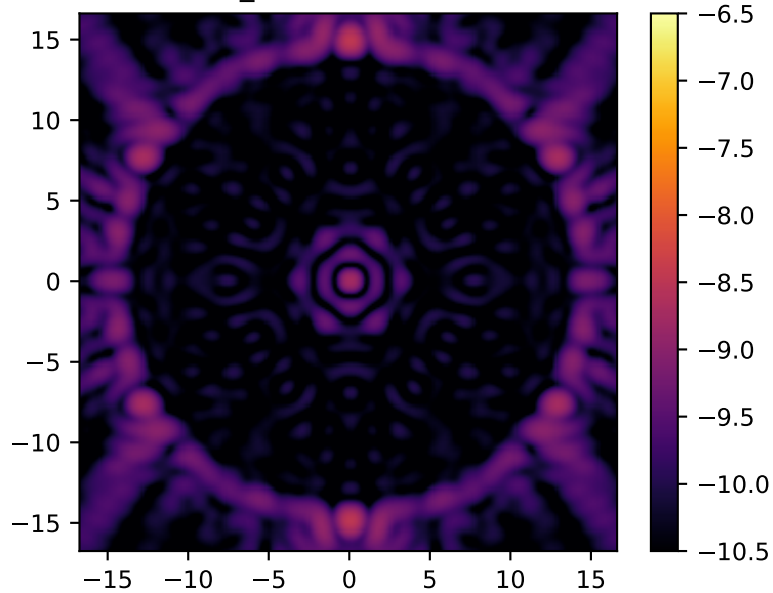
$\sigma_{\text{rms}} = 0.01 \lambda/D$



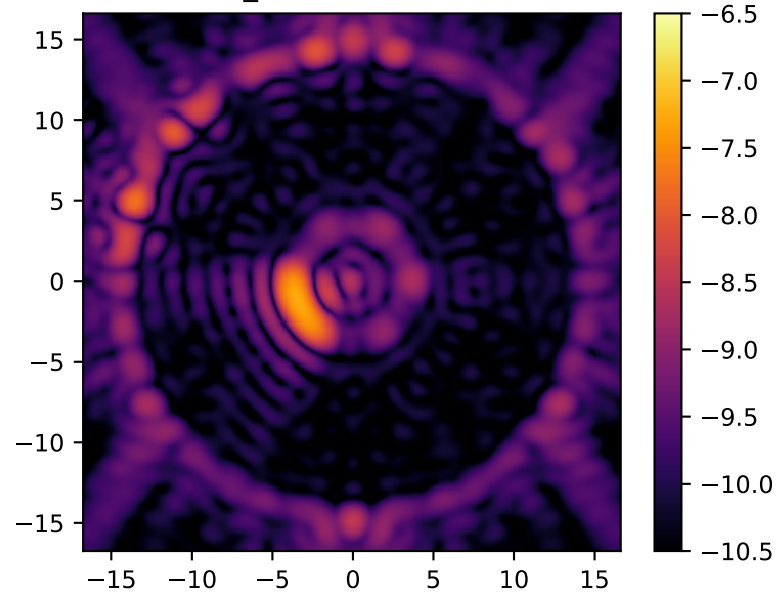
$\sigma_{\text{rms}} = 0.03 \lambda/D$

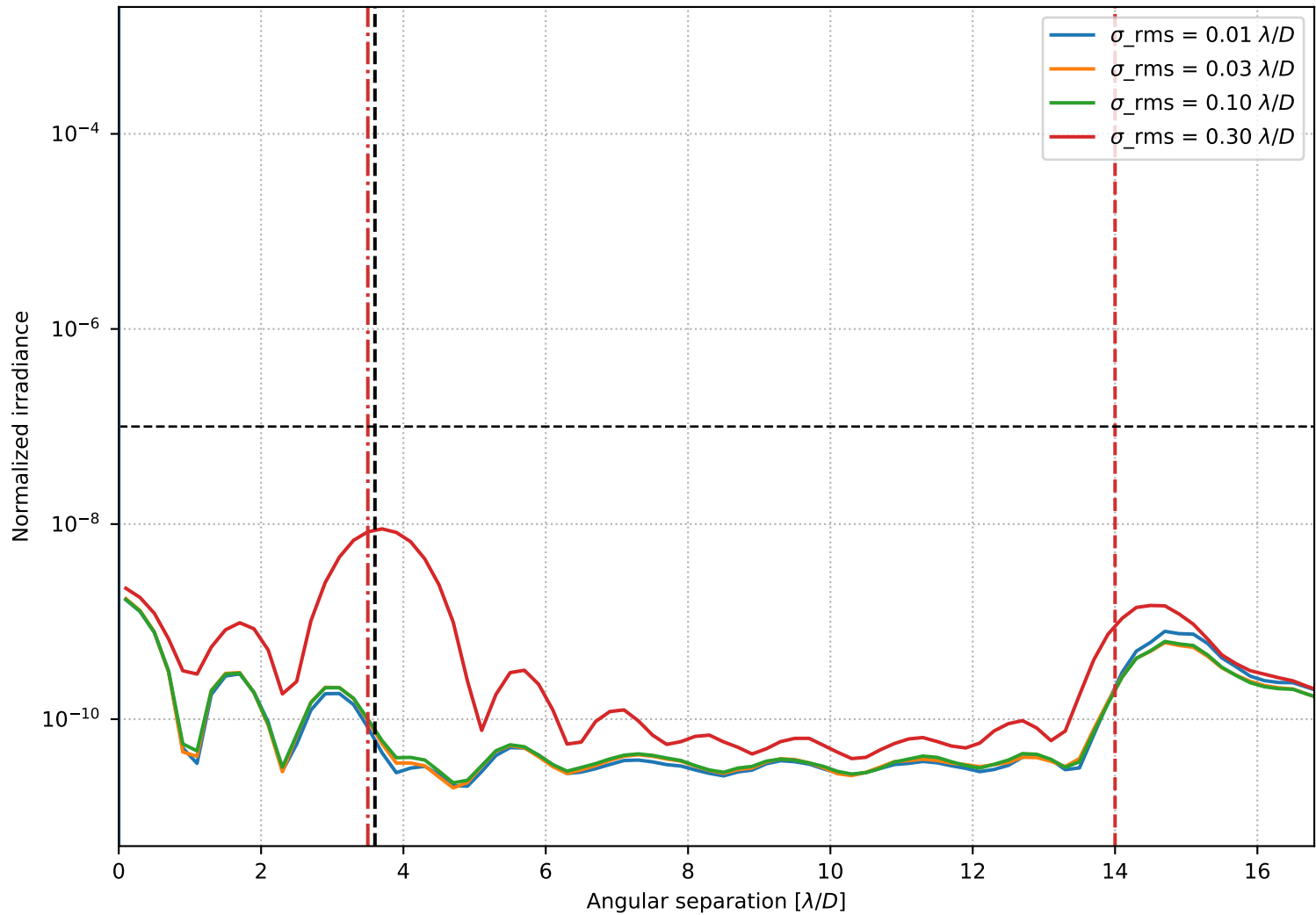


$\sigma_{\text{rms}} = 0.10 \lambda/D$



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





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