APLC Design Summary

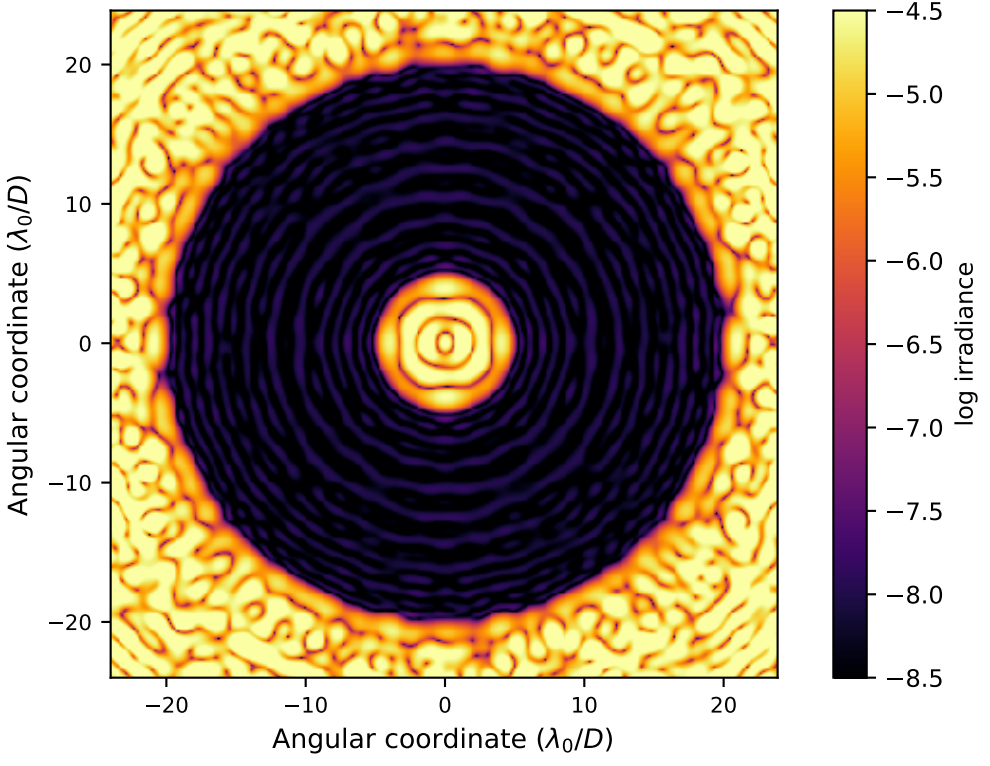
Instrument	SPHERE
nPup	100 x 100 pixels
Coronagraphic throughput (transmitted energy)	0.6759
Core throughput (encircled energy)	0.4547
Lyot stop inner diamater (% of inscribed circle)	0.002
Lyot stop outer diameter (% of inscribed circle)	0.1
Bandpass	20.0%
# wavelengths	1
FPM radius (grayscale)	2.252 λ/D
nFPM	100 pixels
IWA — OWA	5.0—20.0 λ/D
Contrast constraint	10^{-8}
Lyot Stop alignment tolerance	1 pixels

Input Files:

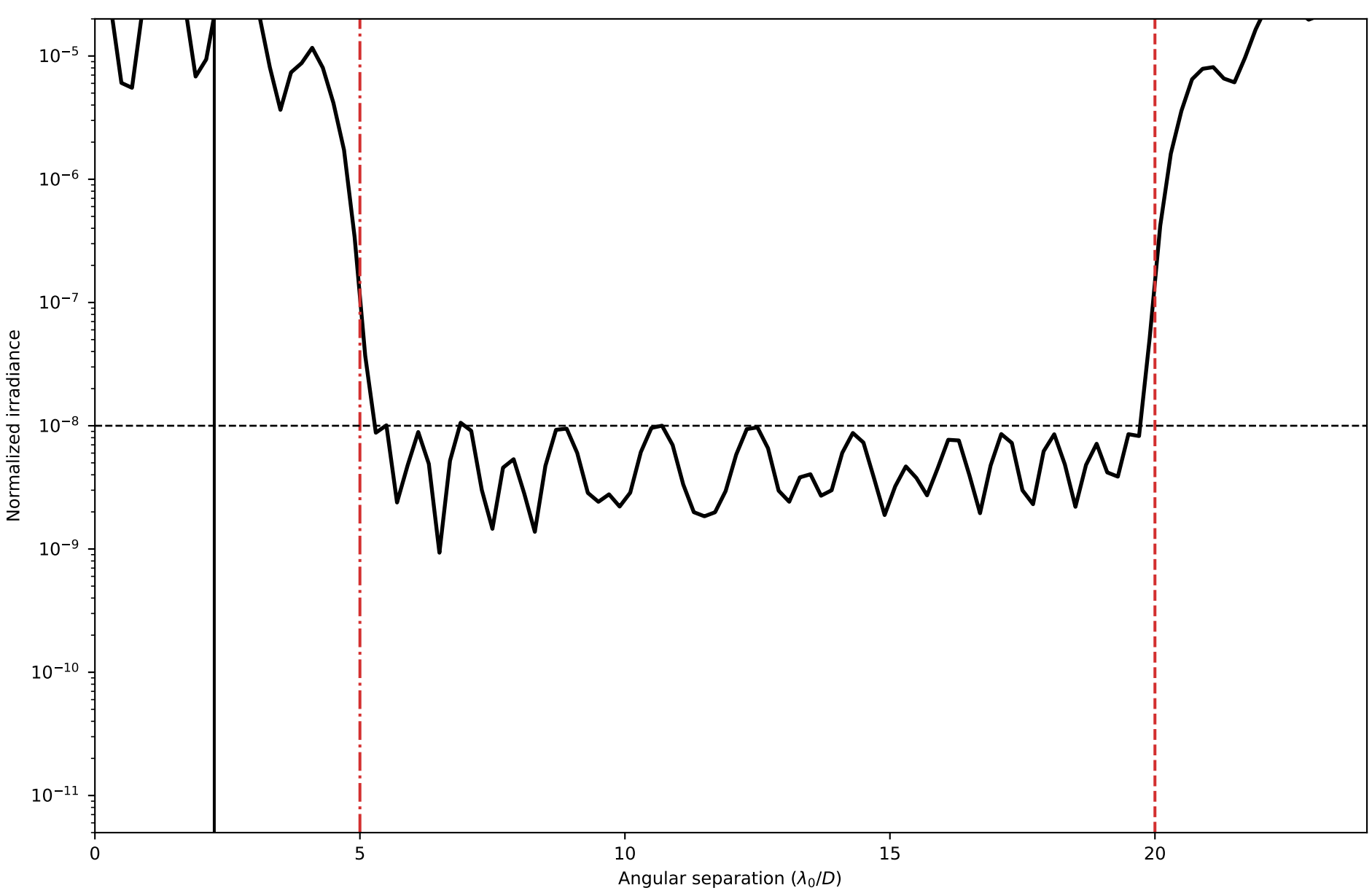
- *Pupil file*: SPHERE/pupil=vlt_btw_nPup=100.fits
- *Lyot stop file*: SPHERE/sphere_stop_ST_ALC2_nPup0100_lr.fits

Solution File:

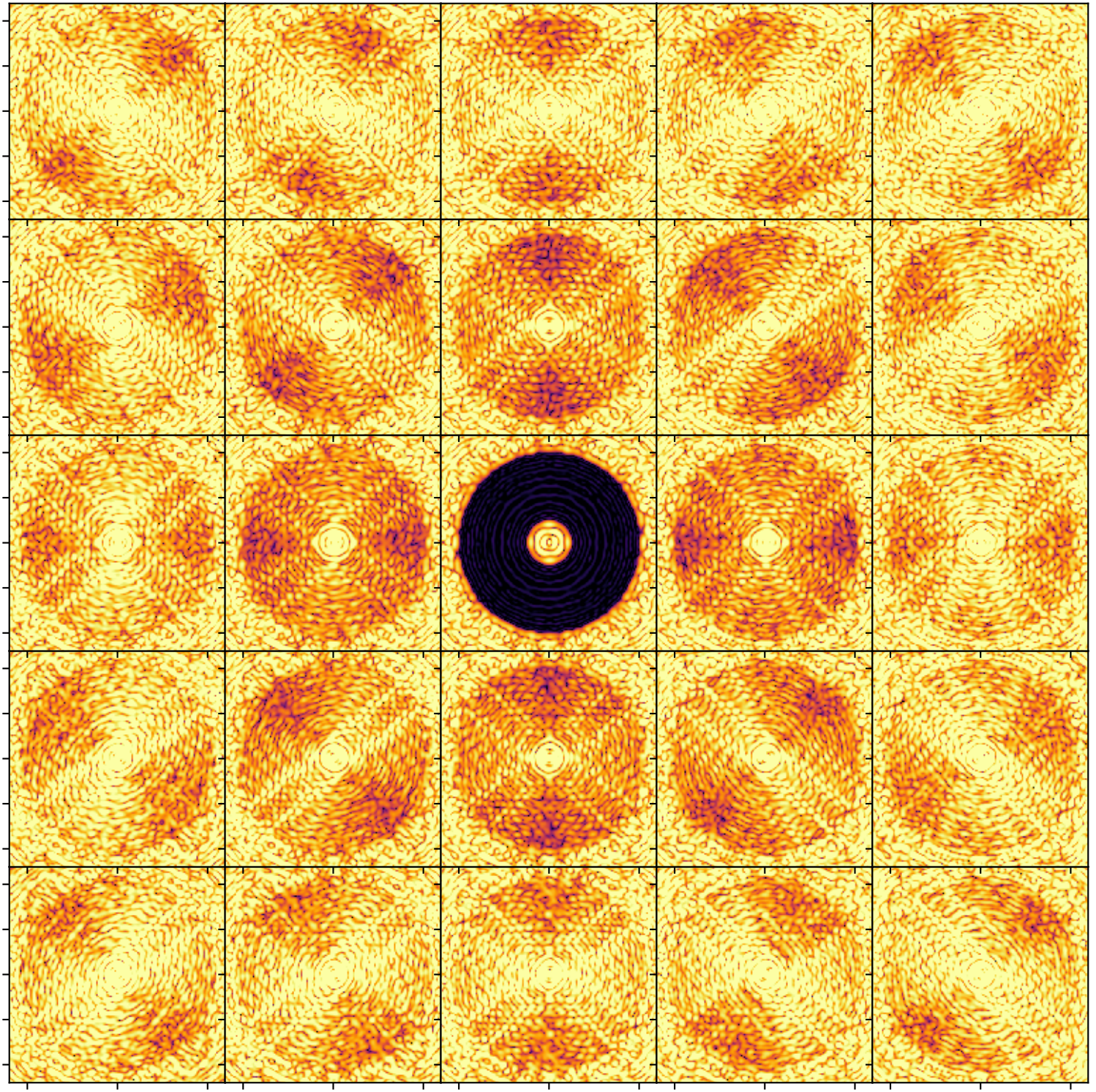
1_SPHERE_N100_FPM225M0100_IWA0500_OWA02000_C8_BW20_Nlam1_LS_ID_ST_A_OD_nPu_ls_0100_lr.fits.fits Tue Aug 1 16:13:37 2023

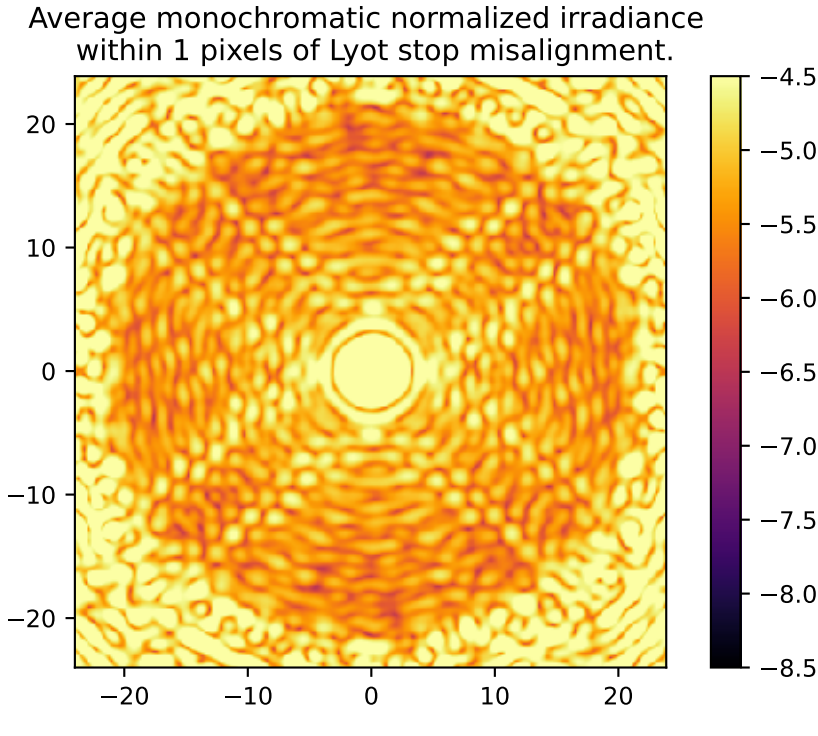


Monochromatic on − axis PSF in log irradiance, normalized to the peak irradiance value.

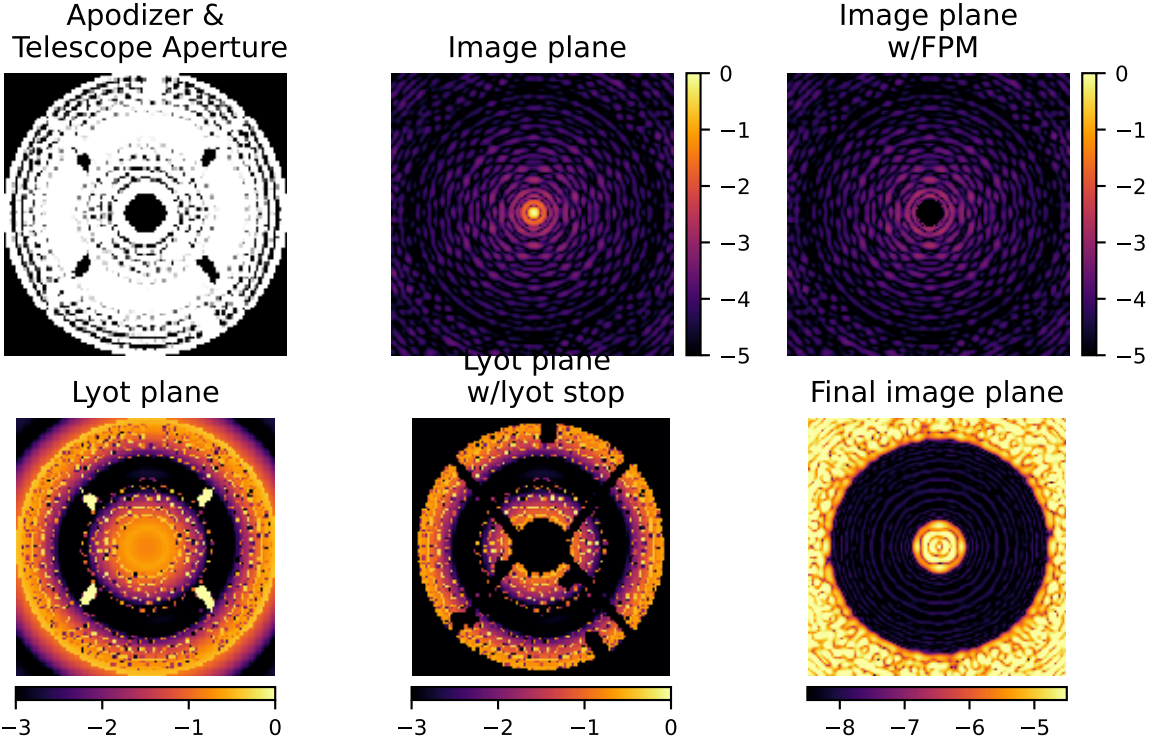


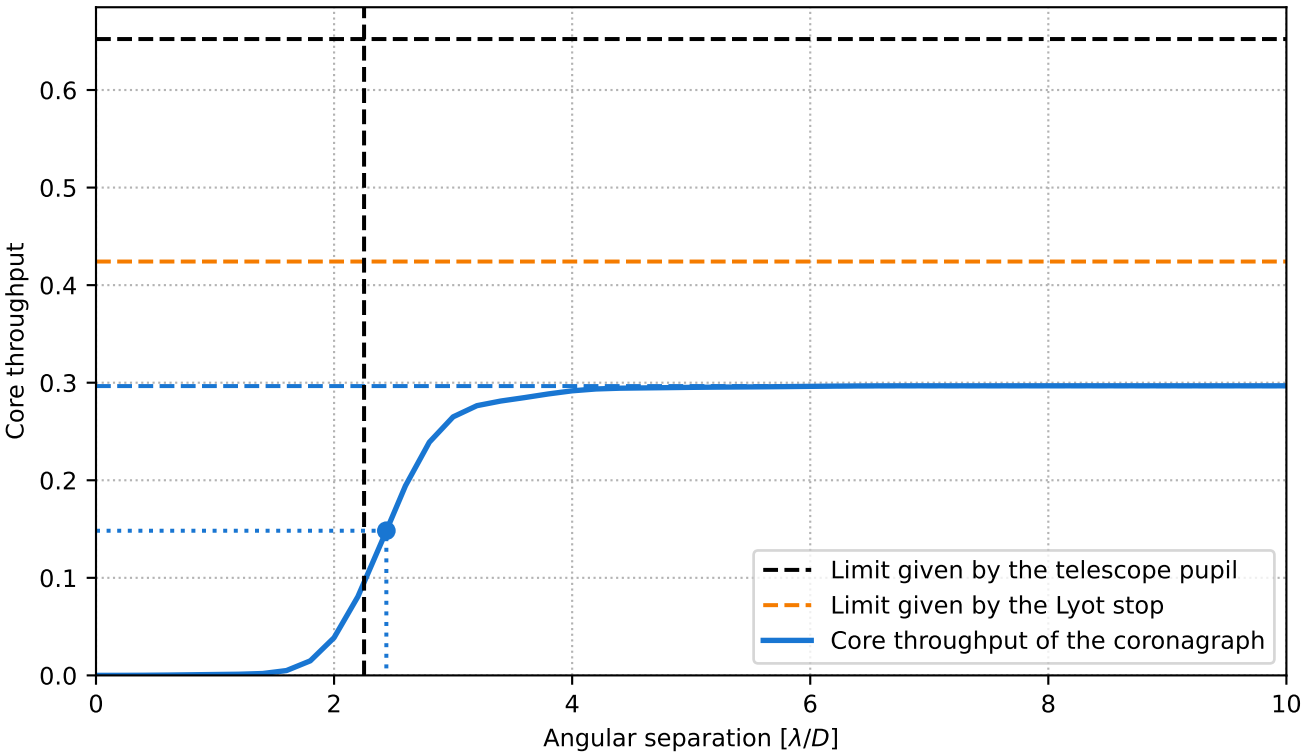
Monochromatic on − axis PSF azimuthally averaged over angular seperations 0.1-33.9 *λ/D, normalized to the peak irradiance. The vertical, solid black line at separation* 2.252 *λ/D marks the radius of the FPM occulting spot. The vertical, red lines at* 5.0 *and* 20.0 *λ/D respectively indicate the radii of the inner and outermost constraints applied during the apodizer optimization.*



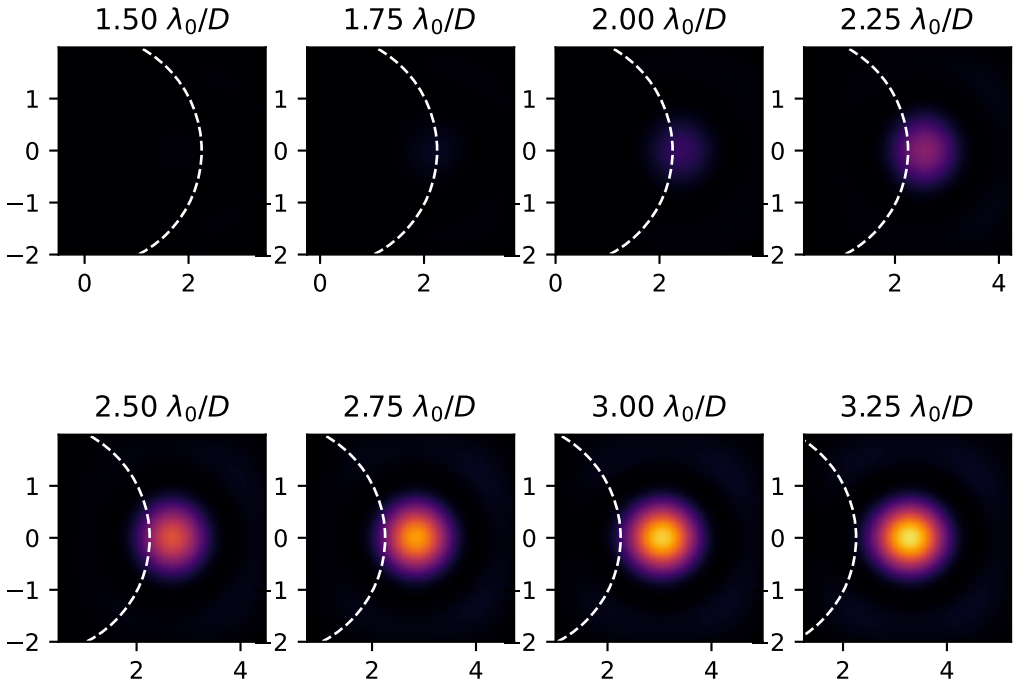

Average monochromatic normalized irradiance
within 1 pixels of Lyot stop misalignment.
20
10
0
−10
−20
−20
−10
0
10
20
−4.5
−5.0
−5.5
−6.0
−6.5
−7.0
−7.5
−8.0
−8.5

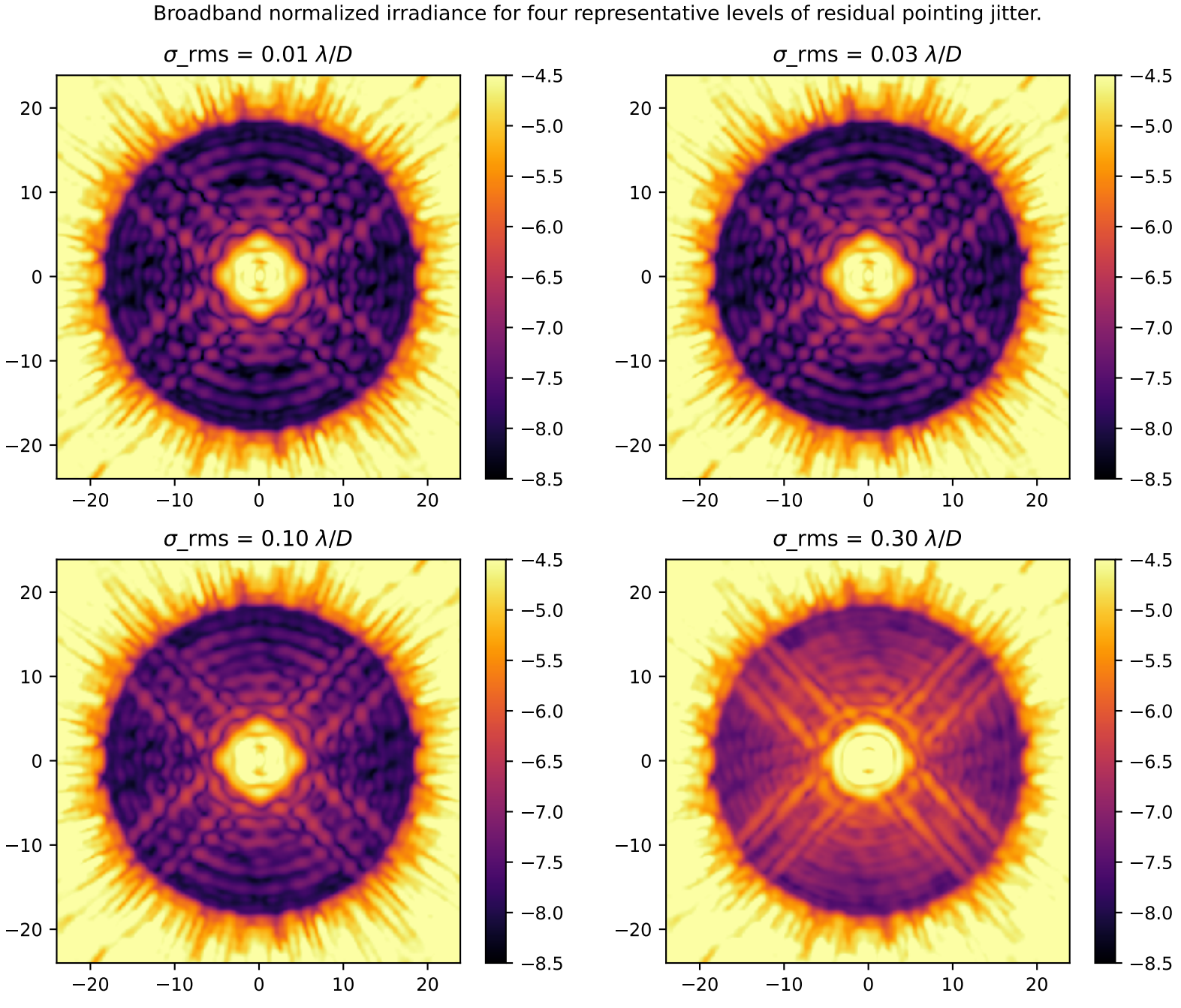
Analysis Summary

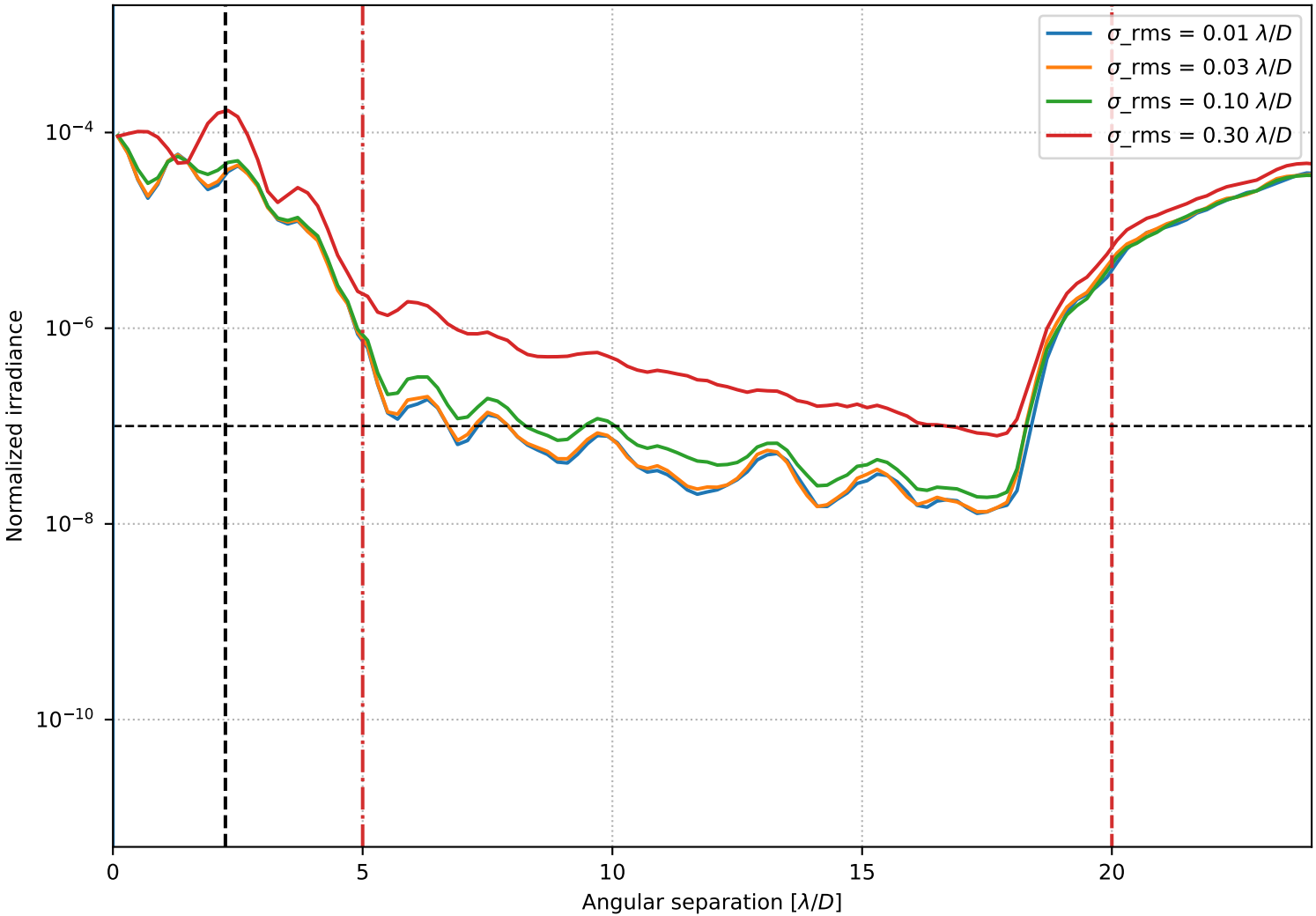




Pupil core throughput:	0.6522279295085497
Lyot stop core throughput:	0.4241897457013047
Maximum core throughput:	0.29654197153356776
Maximum core throughput w.r.t. pupil core throughput:	0.45466003235557634
Maximum core throughput w.r.t. Lyot stop core throughput:	0.6990785952246457
Inner working angle:	2.43912444216185 λ_0/D


1.50 λ_0/D
1.75 λ_0/D
2.00 λ_0/D
2.25 λ_0/D
2.50 λ_0/D
2.75 λ_0/D
3.00 λ_0/D
3.25 λ_0/D


Broadband normalized irradiance for four representative levels of residual pointing jitter.
σ_rms = 0.01 λ/D
σ_rms = 0.03 λ/D
σ_rms = 0.10 λ/D
σ_rms = 0.30 λ/D
20
10
0
−10
−20
−20
−10
0
10
20
−4.5
−5.0
−5.5
−6.0
−6.5
−7.0
−7.5
−8.0
−8.5



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