

APLC Design Summary

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|--|----------------------|
| Instrument | USORT |
| nPup | 128 x 128 pixels |
| Coronagraphic throughput (transmitted energy) | 0.1584 |
| Core throughput (encircled energy) | 0.1329 |
| 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) | 3.7 λ/D |
| nFPM | 150 pixels |
| IWA — OWA | 3.6—14.0 λ/D |
| Contrast constraint | 10^{-10} |
| Lyot Stop alignment tolerance | 0 pixels |

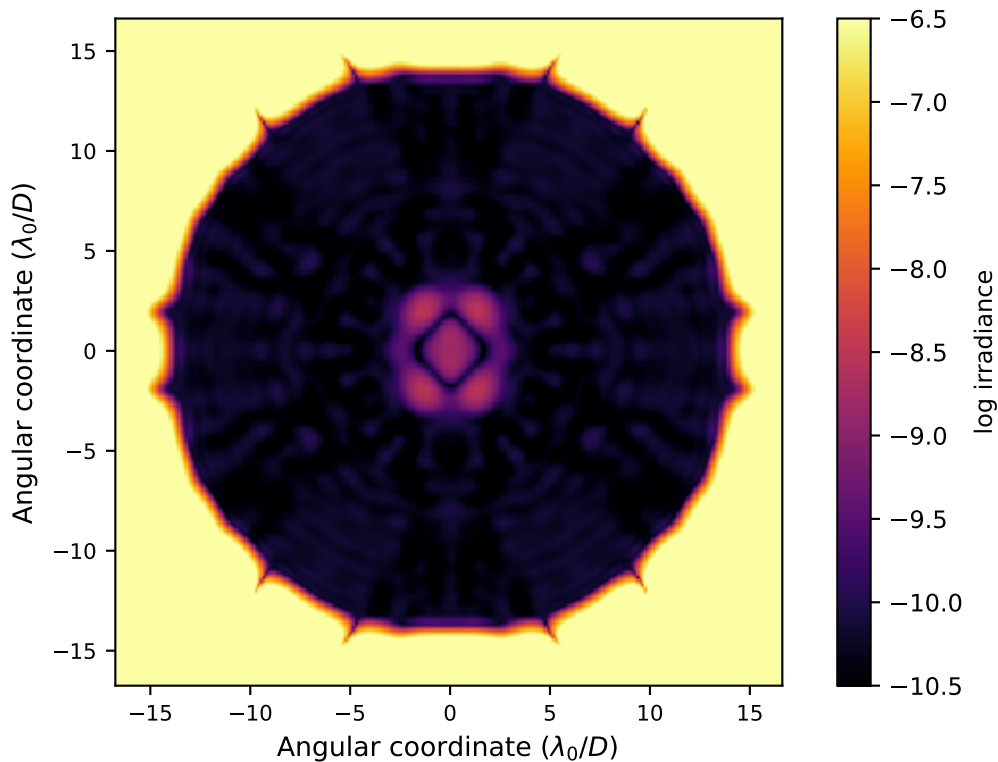
Input Files:

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

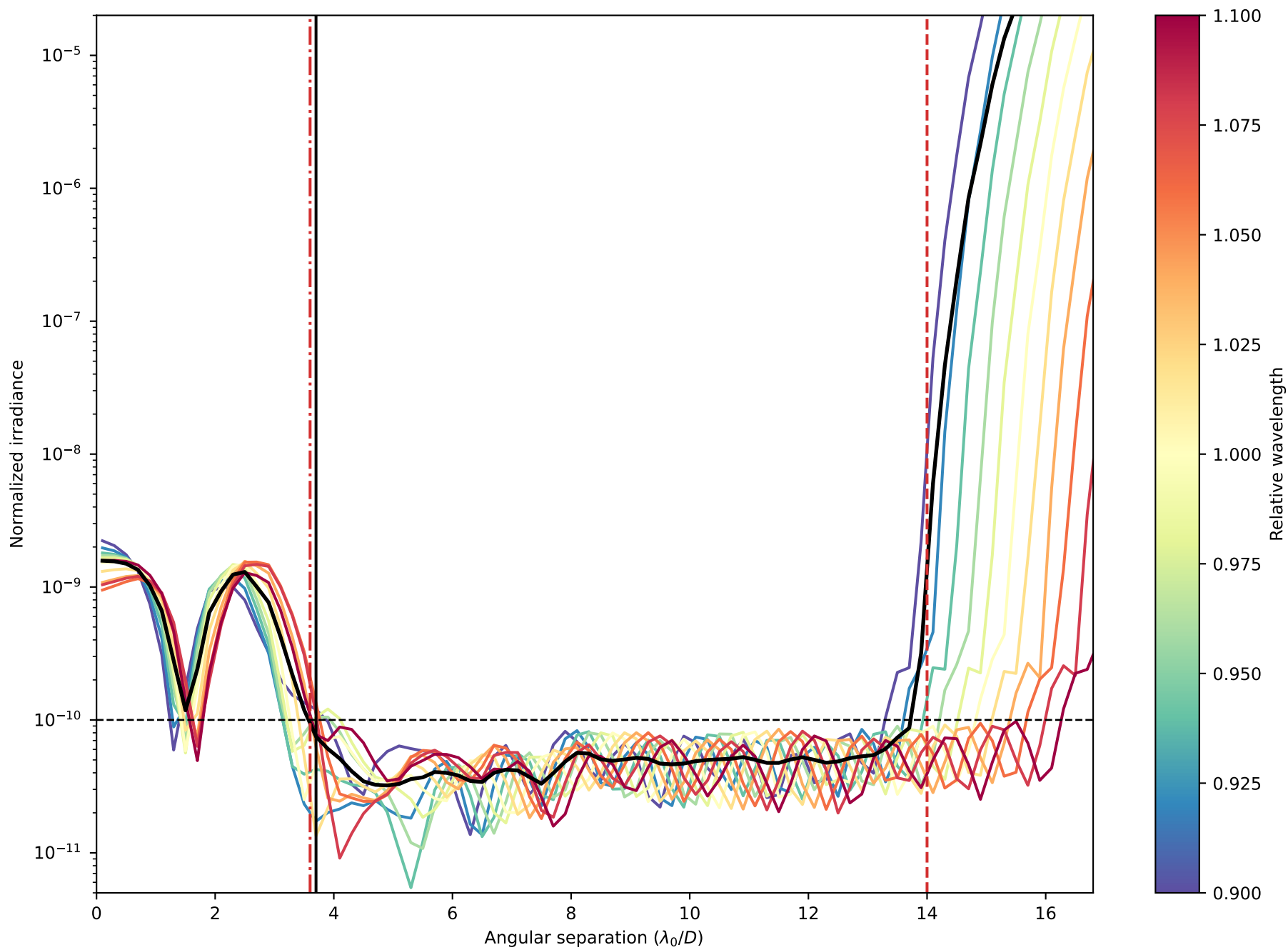
Solution File:

▷ 08_USORT_N128_FPM370M0150_IWA0360_OWA01400_C10_BW20_Nlam5_LS_ID_ID00_ODOD09_Is_0_ovsamp16_N.fits

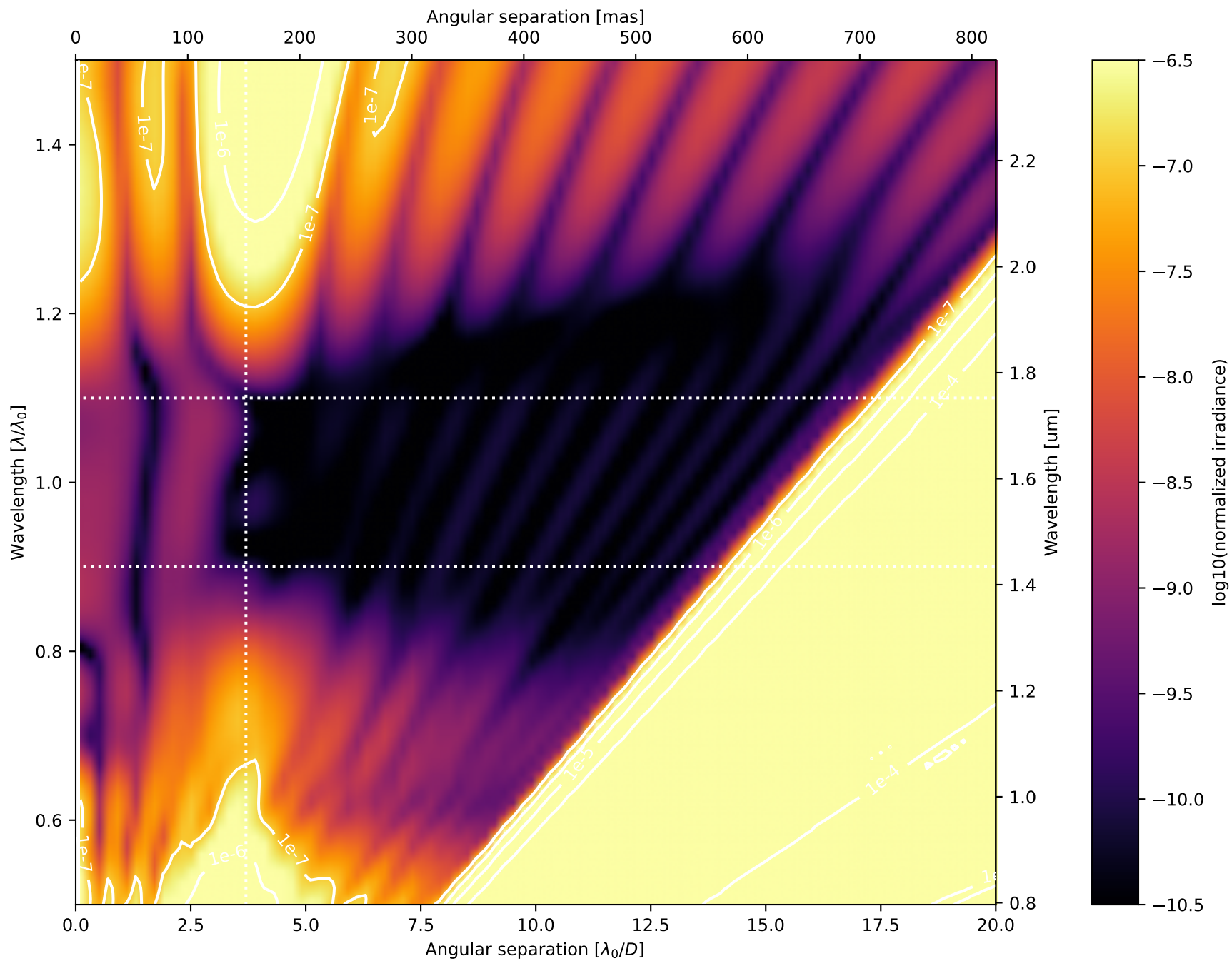
Fri Oct 27 17:42:47 2023

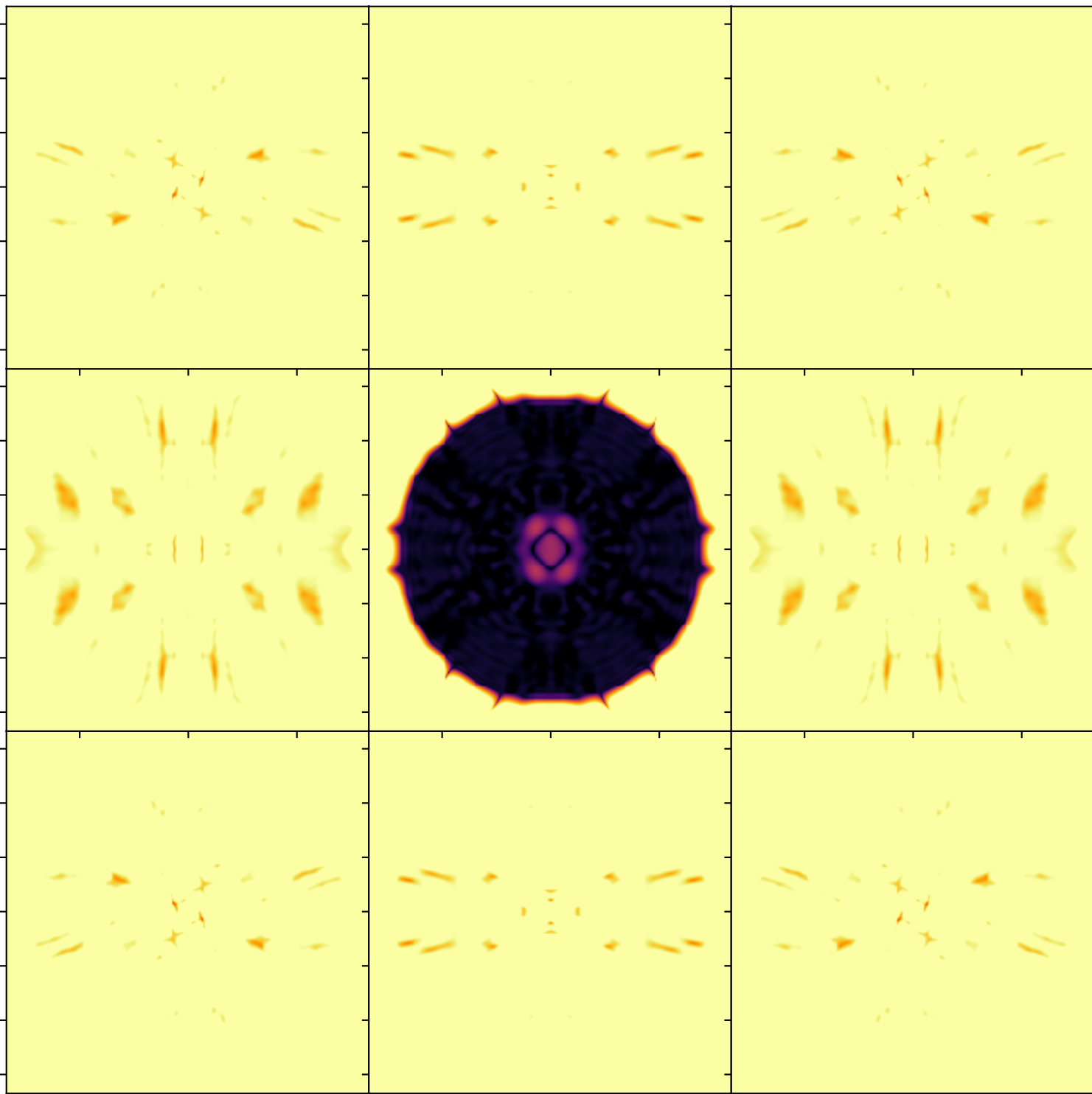


*On – axis PSF in log irradiance,
normalized to the peak irradiance value.*

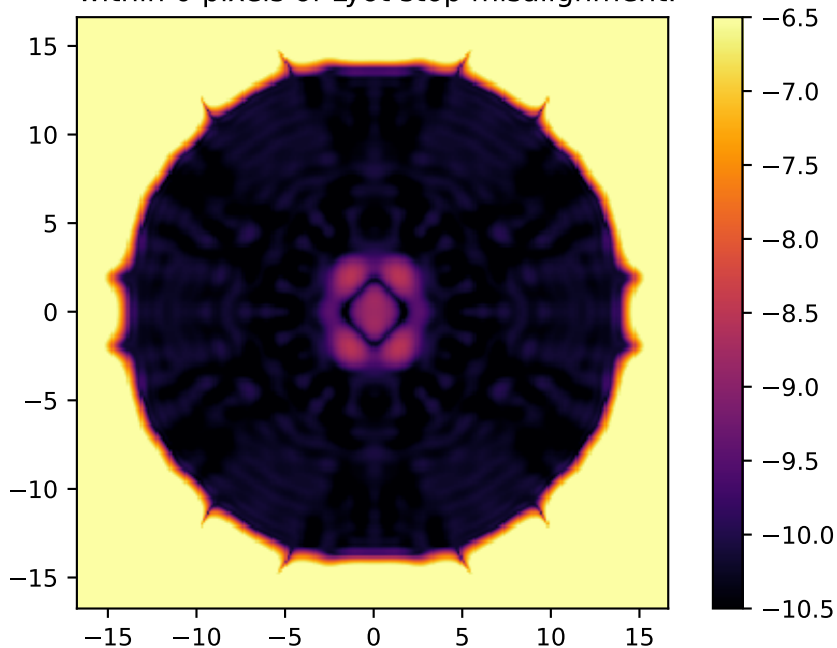


Radial intensity profile for the broadband APLC design at 11 simulated wavelengths centered around λ_0/D and equally spatially sampled over the 20.0% bandpass. The black curve shows the average intensity across the 11 wavelength samples. The dashed red vertical lines delimit the high-contrast dark zone (between 3.6 and $14.0 \lambda_0/D$). The blue dotted line delimits the FPM radius, set to $3.7 \lambda_0/D$.



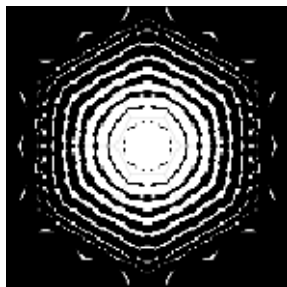


Average broadband normalized irradiance
within 0 pixels of Lyot stop misalignment.



Analysis Summary

Apodizer &
Telescope Aperture



Lyot plane

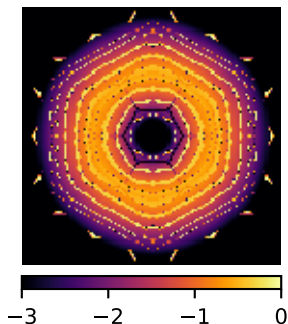
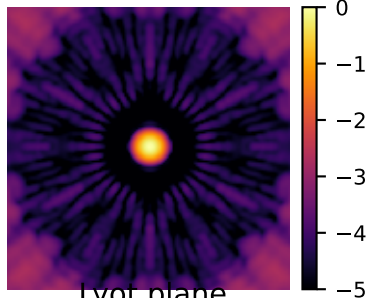


Image plane



Lyot plane
w/lyot stop

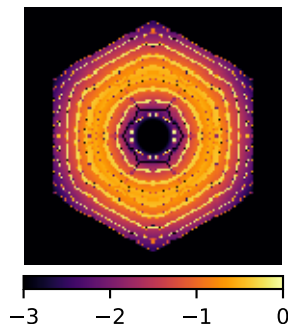
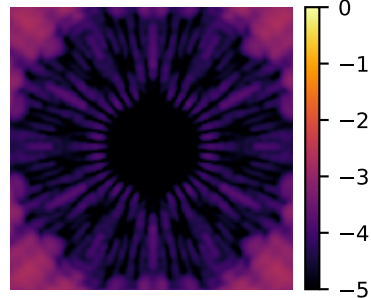
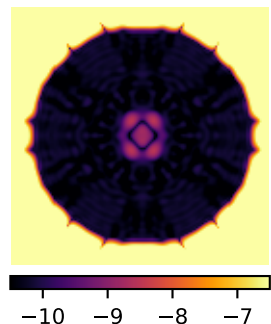
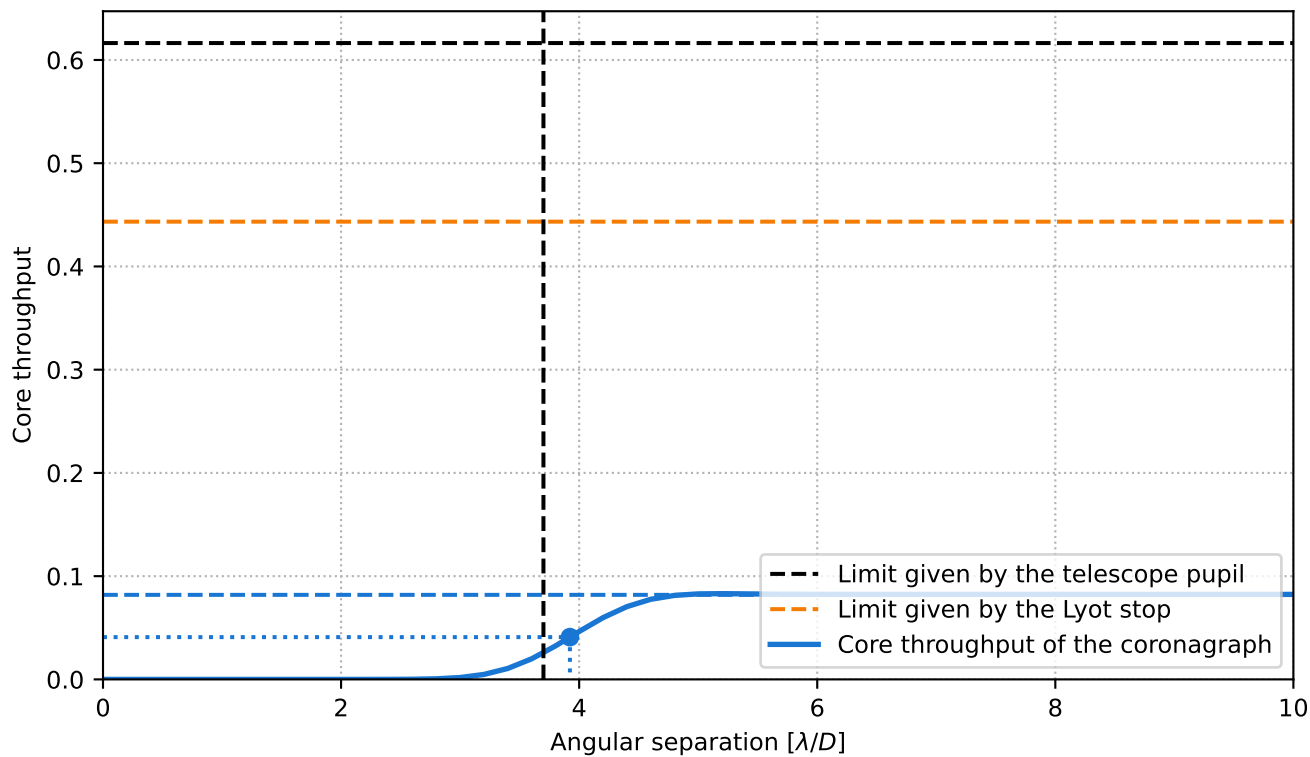


Image plane
w/FPM



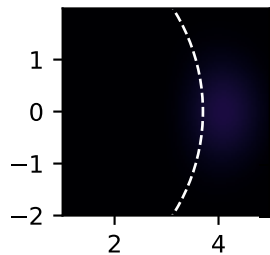
Final image plane



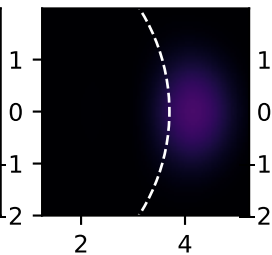


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|---|--------------------------------|
| Pupil core throughput: | 0.6163835963822561 |
| Lyot stop core throughput: | 0.44338273489435265 |
| Maximum core throughput: | 0.08189170827845667 |
| Maximum core throughput w.r.t. pupil core throughput: | 0.1328583511292386 |
| Maximum core throughput w.r.t. Lyot stop core throughput: | 0.18469755773861937 |
| Inner working angle: | $3.92231861608073 \lambda_0/D$ |

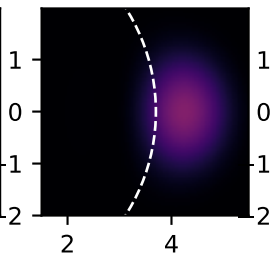
$3.00 \lambda_0/D$



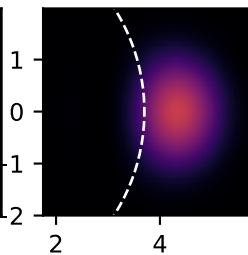
$3.25 \lambda_0/D$



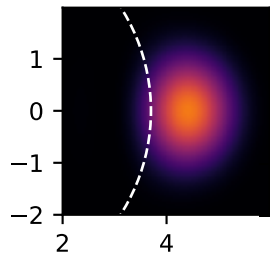
$3.50 \lambda_0/D$



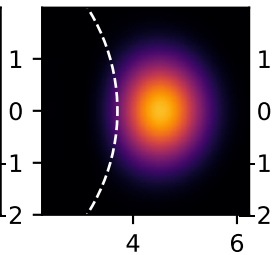
$3.75 \lambda_0/D$



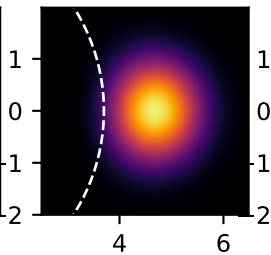
$4.00 \lambda_0/D$



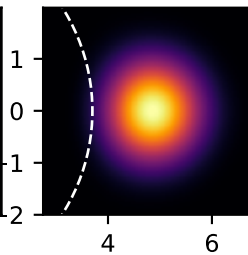
$4.25 \lambda_0/D$



$4.50 \lambda_0/D$

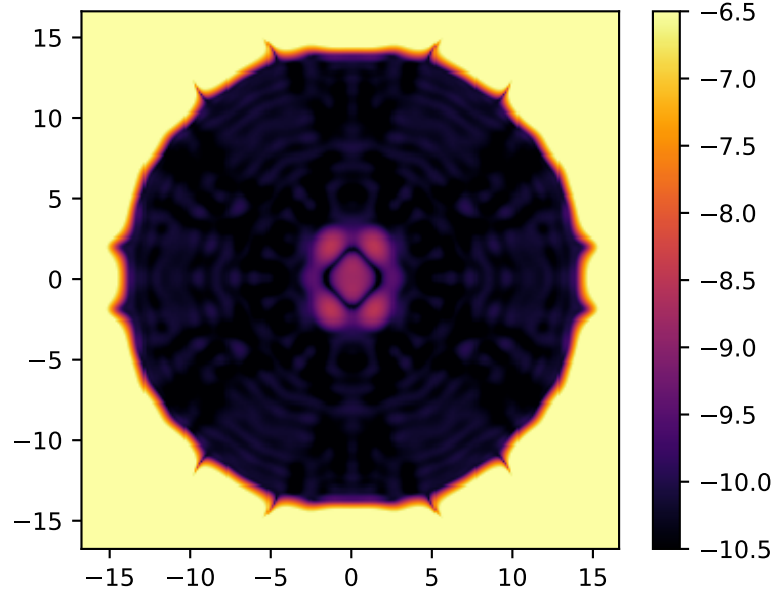


$4.75 \lambda_0/D$

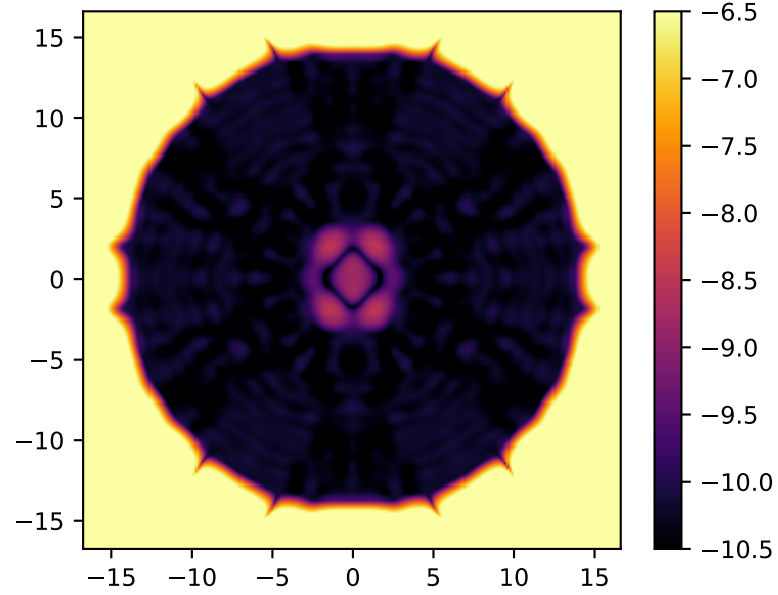


Broadband normalized irradiance for four representative levels of residual pointing jitter.

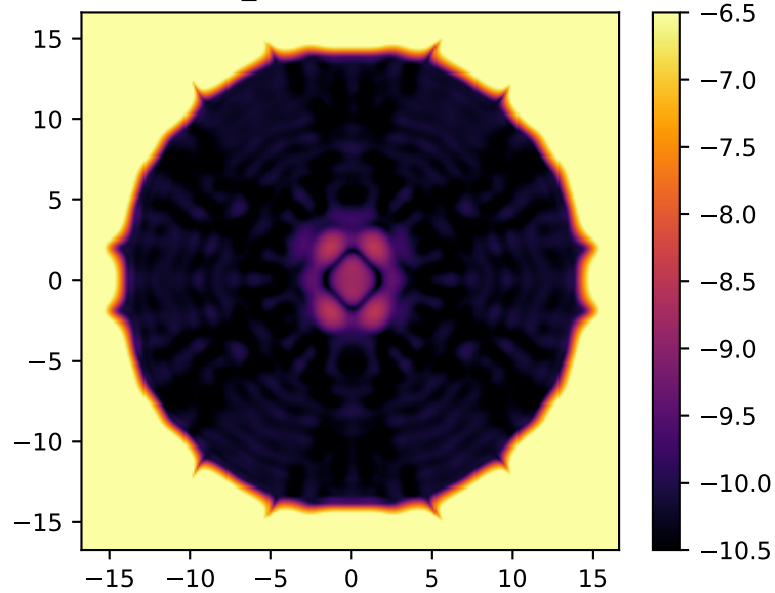
$\sigma_{\text{rms}} = 0.01 \lambda/D$



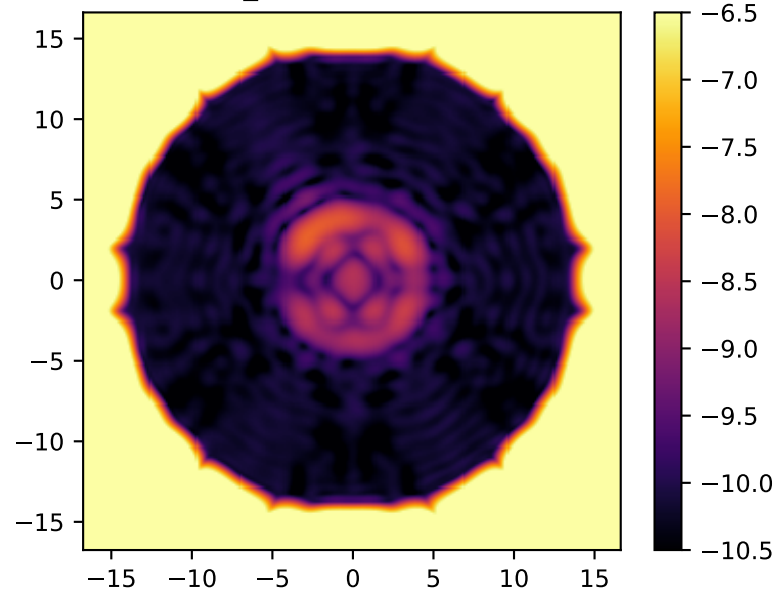
$\sigma_{\text{rms}} = 0.03 \lambda/D$

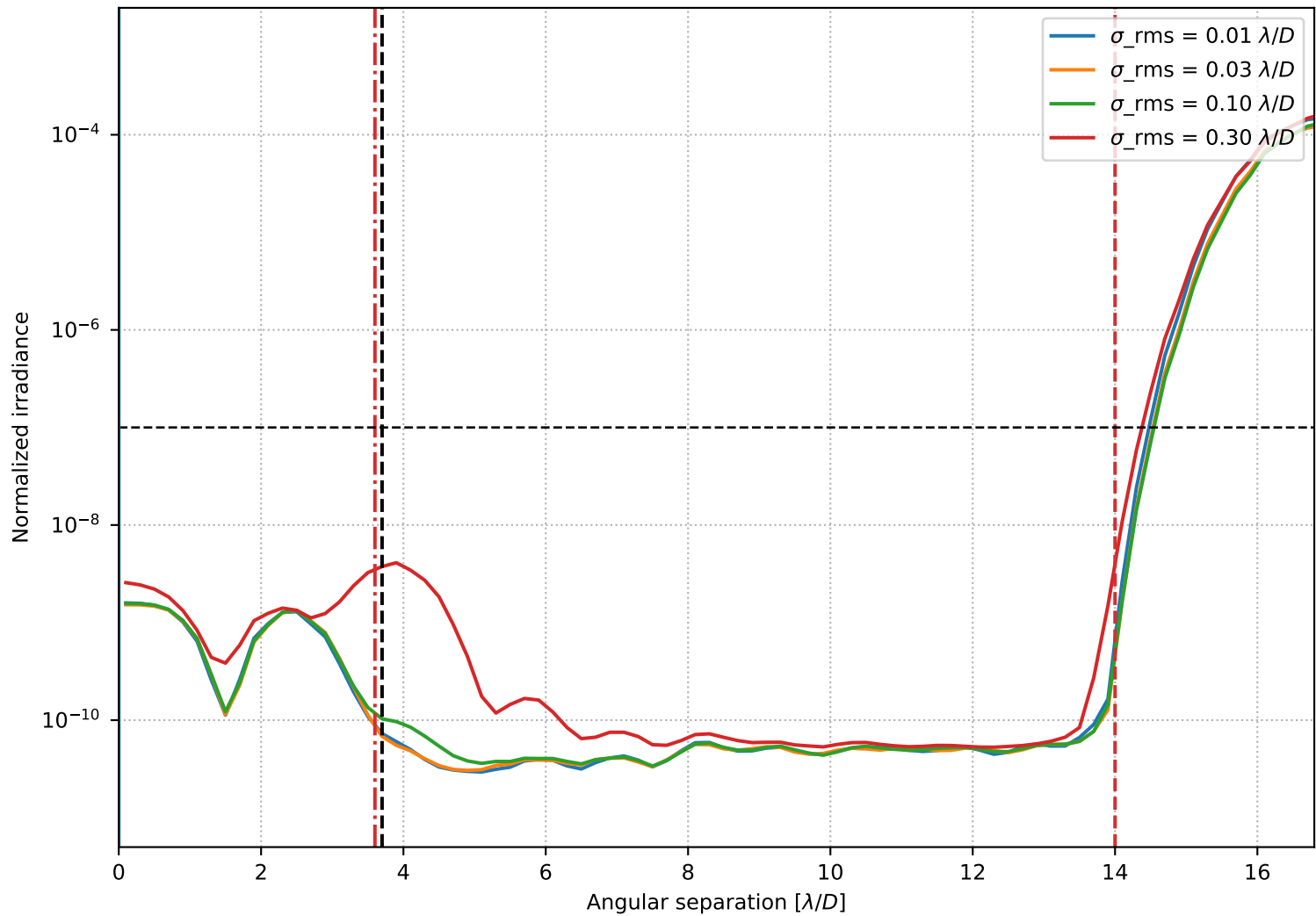


$\sigma_{\text{rms}} = 0.10 \lambda/D$



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





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