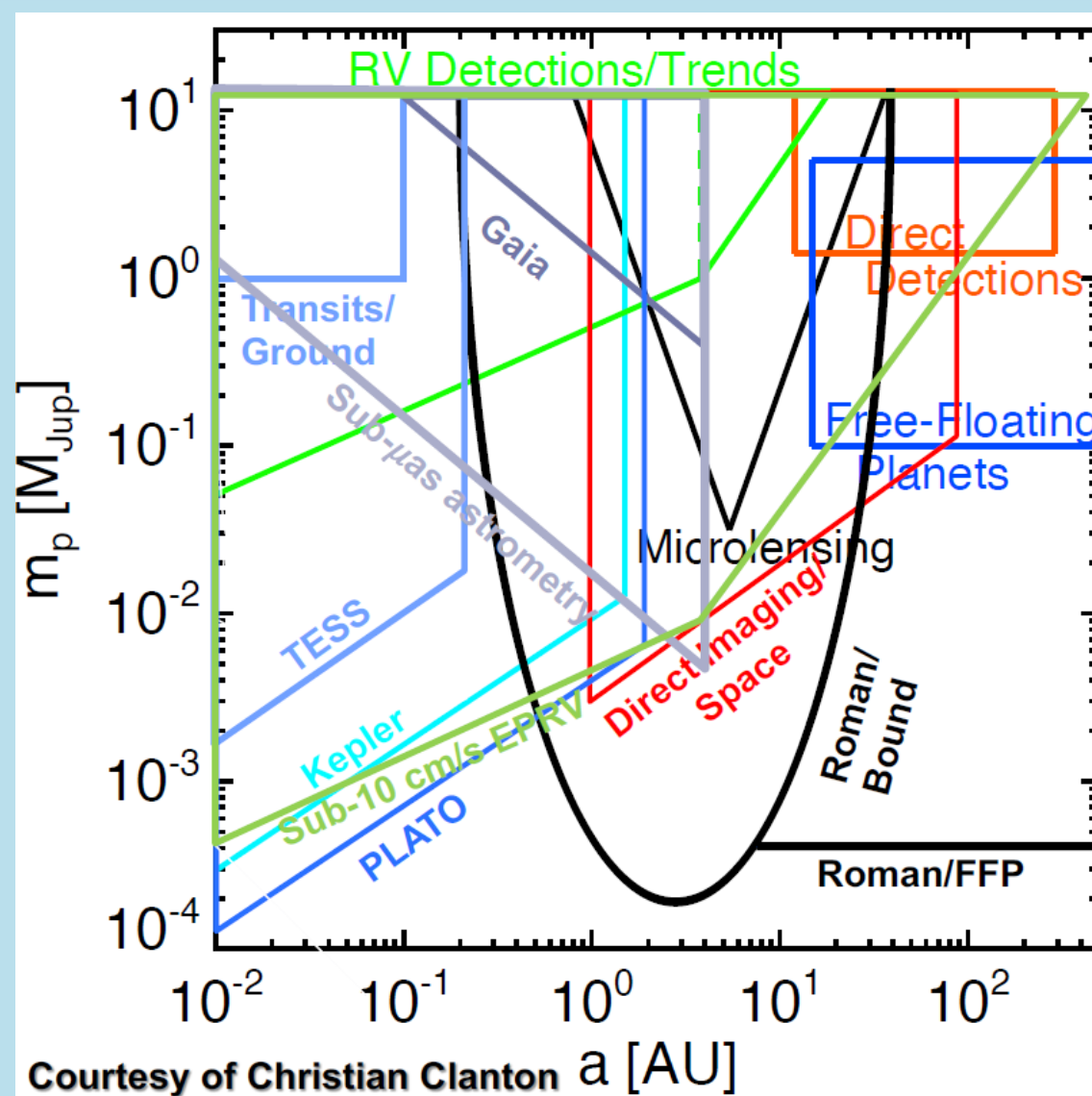


Ultimate targets provider for future space missions such as HWO or LIFE aimed at the spectroscopic detection of bio signatures in the atmospheres of temperate telluric planets.

MAIN SCIENTIFIC TARGET

- Sub- μ as astrometry from space is the only technique capable of performing a complete census of Earth-mass planets in the Habitable Zones (HZs) of F-G-K-type stars within 20 pc from the Sun without selection effects. Typical $V=8-12$ mag
- 1 Earth mass planet in the HZ($a=1$ AU) of a solar-mass star at 10 pc the astrometric signal is $\approx 0.3 \mu$ as



SCENARIO

- Dedicated sub- μ as astrometry instrument configuration
- Local-differential astrometry
- Innovative TMA design** which reduces the complications of the classic TMA while maintaining its large corrected field advantage.
- Innovative technique for PSF centering** at the 1/5900 pixel level to reach sub- μ as astrometry.

IDEA

- On-axis telescope materialized by means of annular mirrors (rings)
- Annular focal plane -> ring of detectors

OPTICAL DESIGN: LAYOUT

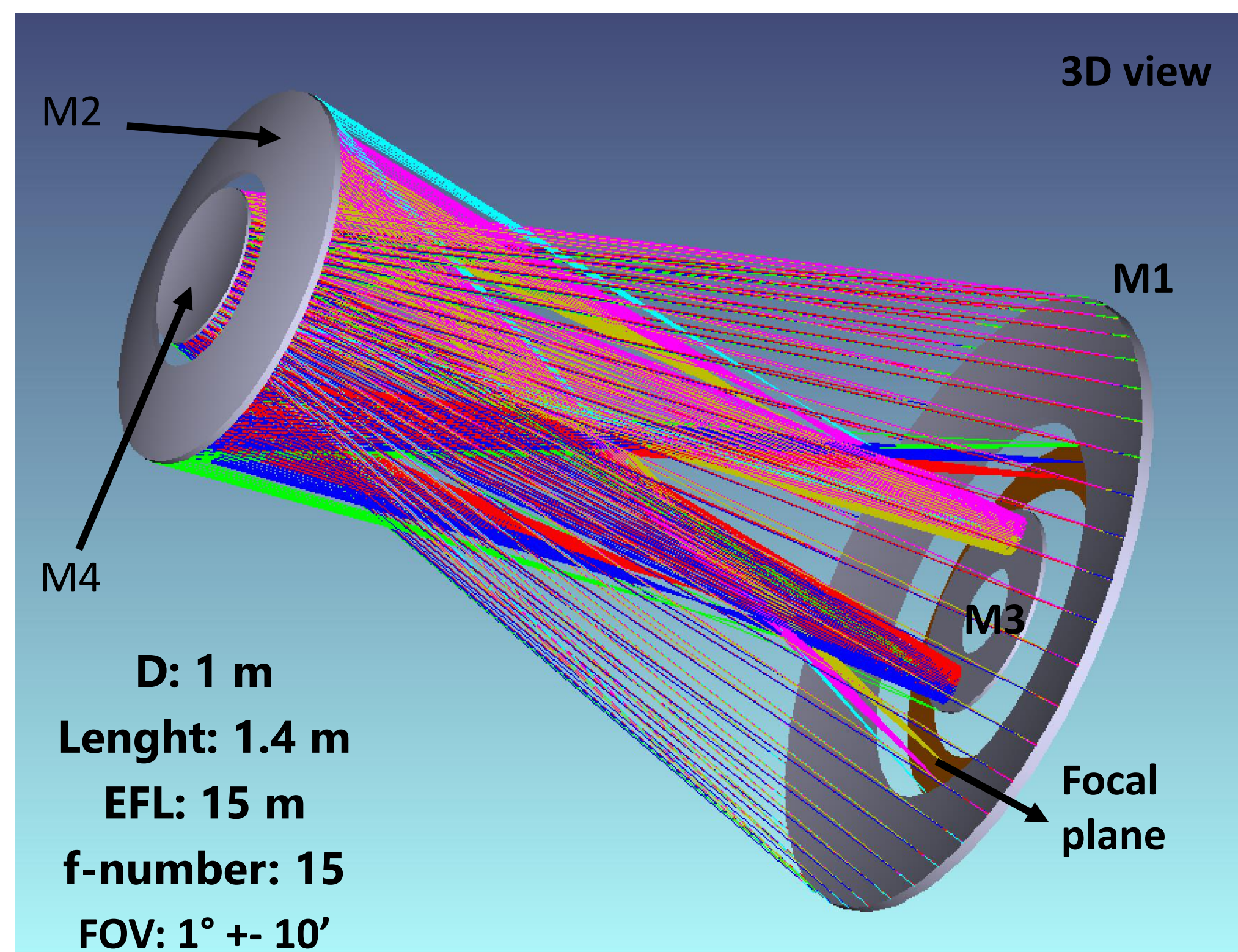
❖ **Compact structure** \rightarrow **whole envelope: <2 m**

❖ **Simmetry**

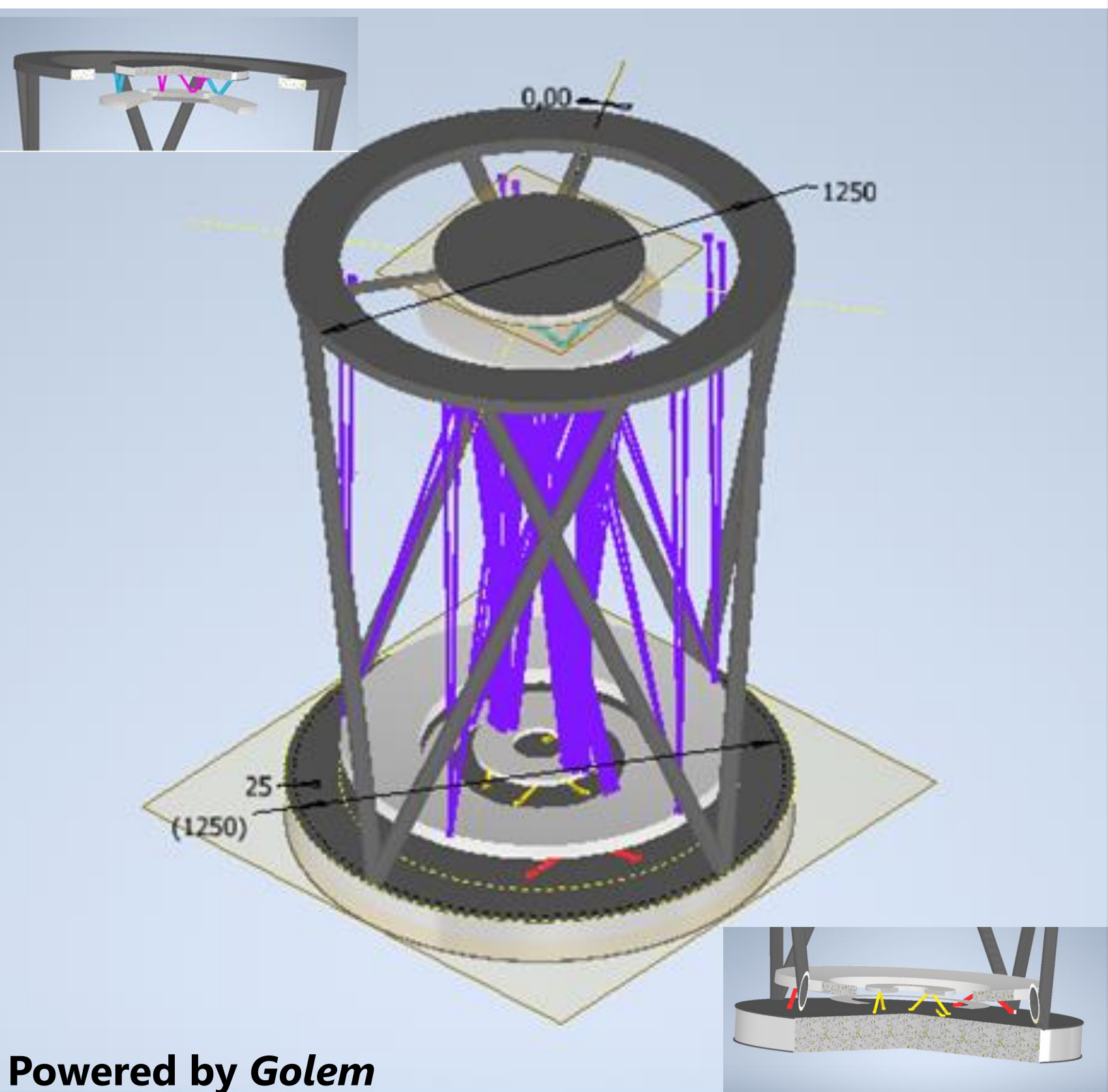
❖ **Simplified alignment of M1/M3-M2/M4 zones**

The tilting of the elements together are compensating

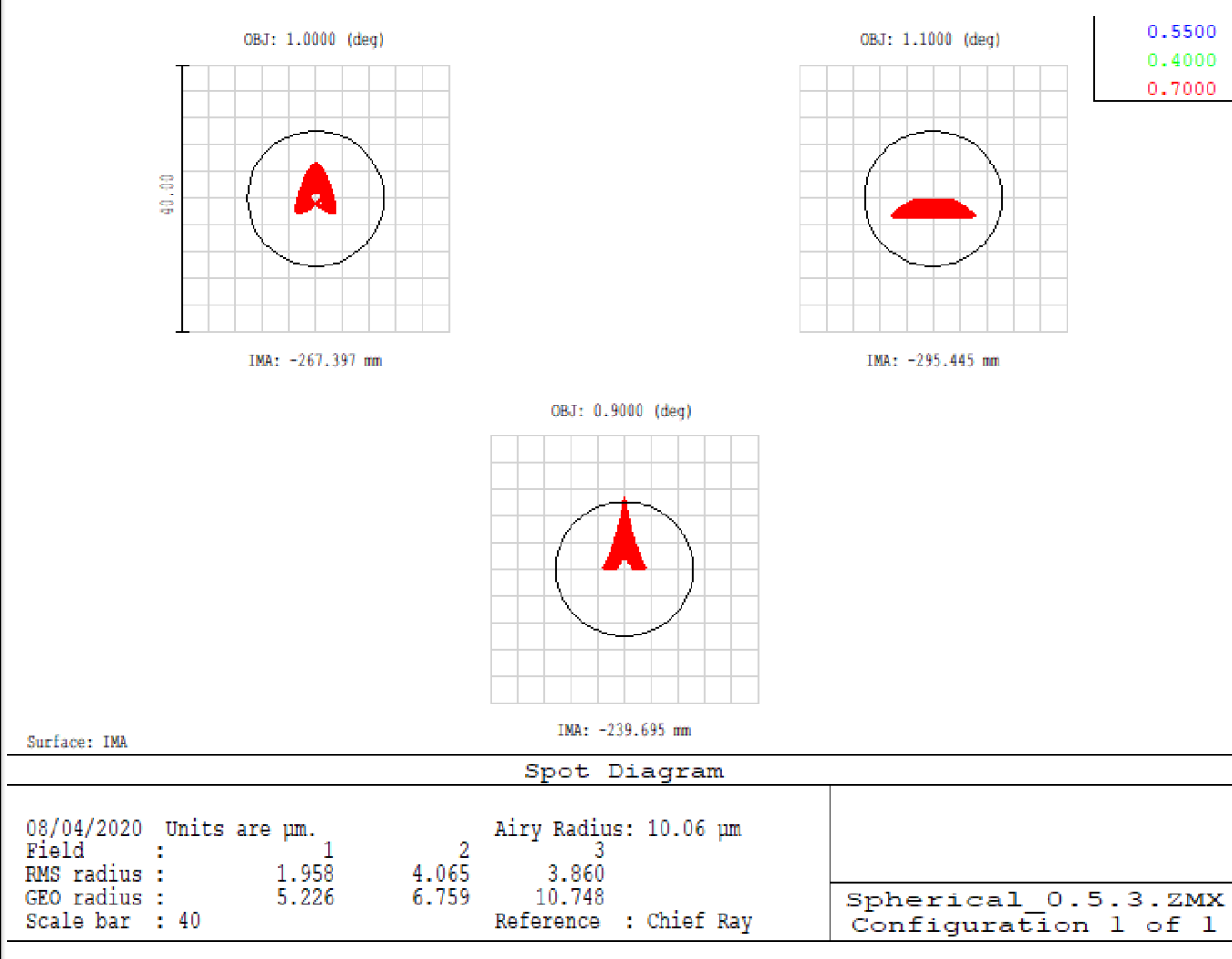
- ✓ The telescope is naturally split into two smaller optomechanical units, facing each other;
- ✓ mutual placement stability of the nearby mirrors, relaxing the overall number of degrees of freedom and complexity;
- ✓ each mirror pair is subject to a common local thermal environment, including its thermo-elastic perturbations



OPTO-MECHANICAL CONCEPT



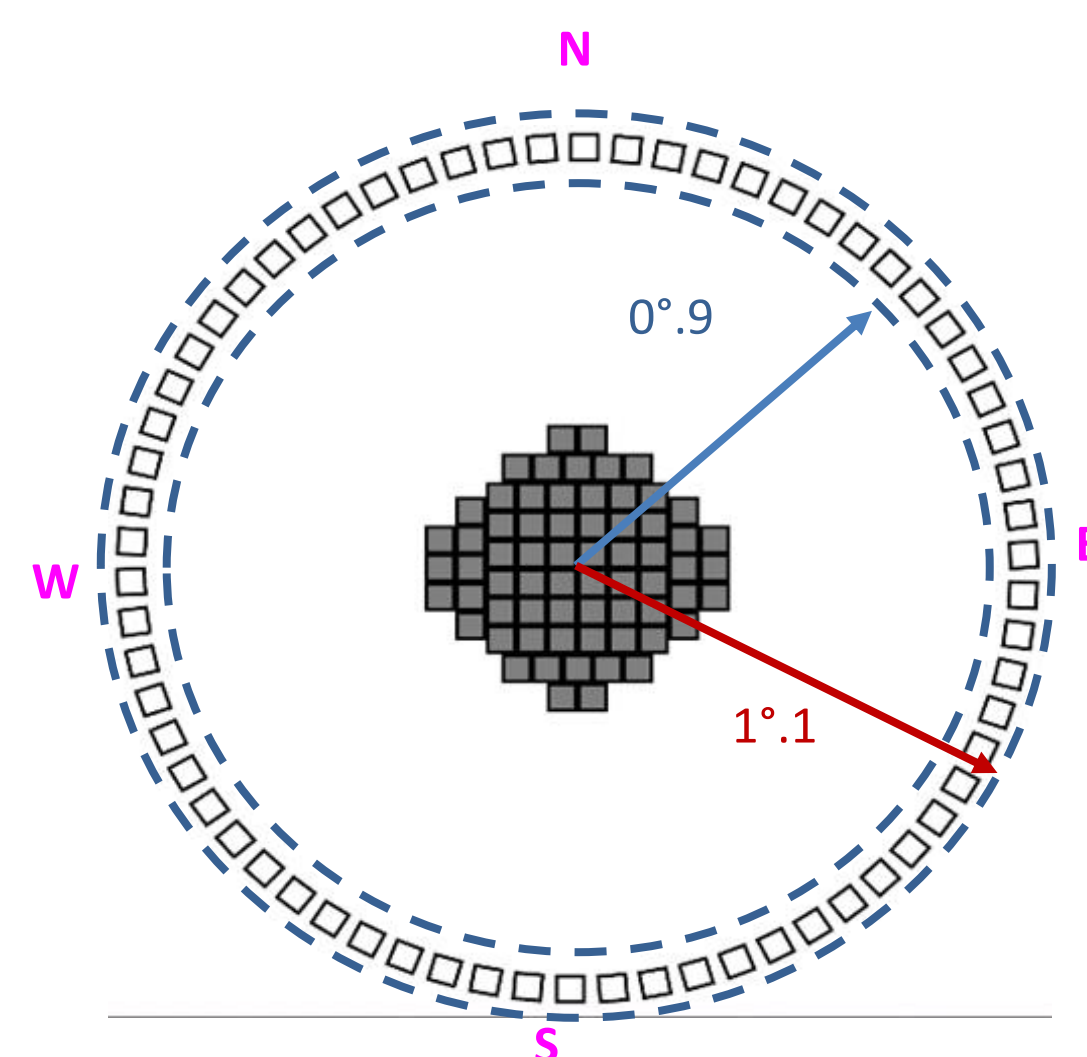
OPTICAL QUALITY: DIFFRACTION LIMITED



REFERENCES

Riva et al. SPIE 2020
Gai et al. PASP 2022
Fornasiero et al. SPIE 2024
Scandaglia et al. SPIE 2024
Clanton et Gaudi ApJ 2016

- Platescale 50 mas/pixel
- Compatible with 4-5 μ m pixel CMOS detectors



Rings of 66 hypothetical detectors (4k x 4k)
(Same number of device arranged around optical axis for comparison)