

# **ET Optical Layout Workshop #3: from triangle to 2L**

**Monday 8 July 2024 - Friday 12 July 2024**

**European Gravitational Observatory**

## **Scientific Programme**

**Core tasks towards the primary goal:**

Choice of arm cavity geometry: several options are already listed here. We should check the FSR for 15km vs 10km, the impact on overall detector sensitivity bucket and e.g. HOM resonances

Determine major lengths for 15km: HF SEC length, LF filter cavity length(s), IMC lengths, check if other major lengths (LF SEC, HF FC, PRC lengths), that were non-limiting for 10km become limiting for 15km.

Develop first recycling telescope designs using the same logic as  $\Delta$ , using placeholder values before (4)

Clash detection and 3D considerations: iterations with ETO to a plausible conceptual layout of major elements

Identify key outstanding tasks before the full 2L layout is as 'complete' as the  $\Delta$  & can be frozen  
Documentation

**Additional goals (if key people available):**

For the triangle layout:

Address & resolve any issues raised by ongoing detector layout work

Improved/completed documentation (gaps in the pdf, parameter file)

For both layouts:

Tolerance studies (length, angle, RoC)

Detailed work on priority tasks outlined in the "future work" section of the  $\Delta$  layout pdf: telescopes needed for auxiliary benches, LF IMC requirements, BHD decision evaluation, Scattered light implications, WF sensing/control strategy for LF (cold defect matching etc)