

Fore Optics (Annular Folding Mirror) – GWS Optical Interface

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Brief Description: This document describes the optical interface between the annular folding mirror and the GWS.		
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Interface Description

This document describes the optical interface between the folding annular mirror and the GWS. The annular folding mirror is the first optical element of LINC-NIRVANA encountered by the beams coming from the two telescopes. The mirror has a hole in its central part to let the 2 central arcminutes of the FoV go to the LINC-NIRVANA system, while the mirror annulus has the purpose to fold the light to the GWS. The optical interface is the F/15 focal plane created by the telescope optics (FP15 in the following).

Interface Specification

In Figure 1 the reference frame is defined. The (X, Y) position of the origin coincides with the center of the cryostat hole; the Z position of the origin is the height on the bench of the optical axis of the beams coming from M3.

With respect to this origin, the center of the FP15 is:

$$X = \pm 1897.890 \text{ mm}$$

$$Y = 199.266 \text{ mm}$$

$$Z = 0.000 \text{ mm}$$

where the \pm sign refers to the FP15 focal plane of the two LBT arms.

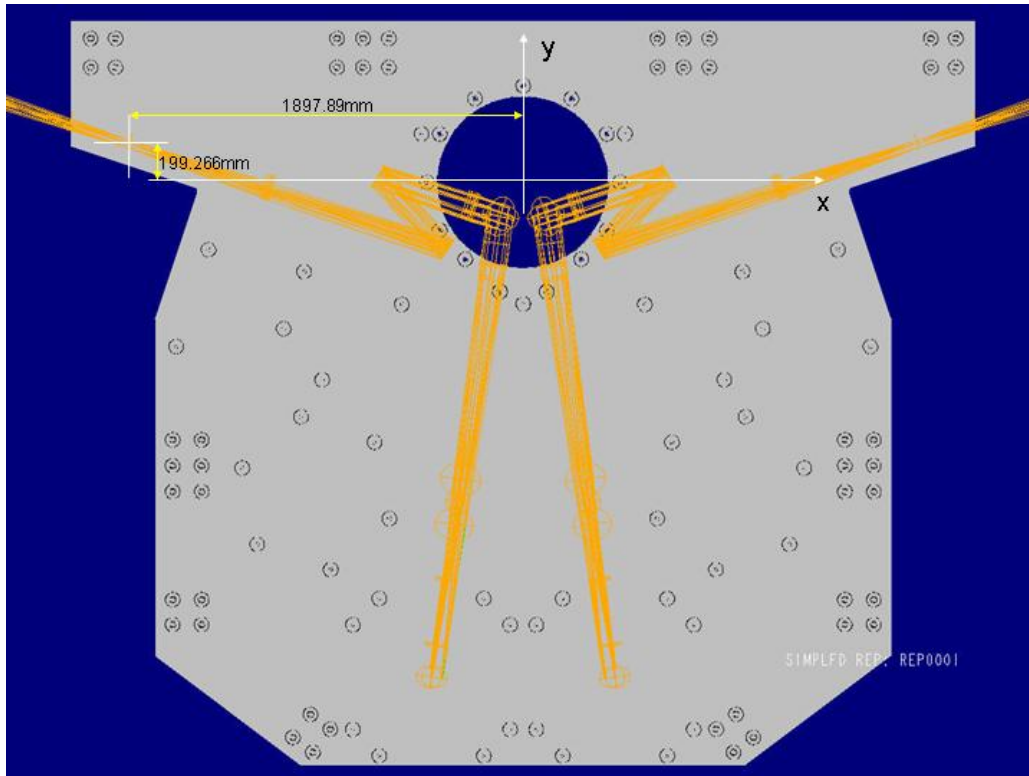


Figure 1. Definition of XY coordinate system on the LN bench. The Z axis is orthogonal to the XY plane, with the positive direction coming out from the drawing. The origin of the Z axis is defined by the height of the optical beam coming from the telescope, and it should be 268 mm above the top surface of the optical bench.

Special Requirements

The annular folding mirror shall provide:

- A central hole dimensioned in a way not to vignette the central 2' FoV
- A tip-tilt adjustment, to fold the beam with the correct angle (required sensitivity 10")

All the adjustments shall allow positioning of the FP15 with a precision of 0.1mm (along the optical axis) and with a maximum tilt of 10".

The GWS shall have X, Y, Z adjustments (by shimming). The travel of these movements depends on the positioning accuracy of the optical bench with respect to the telescope and on the positioning accuracy of the GWS with respect to the optical bench. The sensitivity of these movements shall be lower than 50 μm .