

OPTO-MECHANICAL DESIGN OF FRIDA

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FRIDA (inFRrared Imager and Dissector for the Adaptive optics system of the Gran Telescopio Canarias) is being designed as cryogenic and diffraction limited instrument that will offer with broad and narrow band imaging and integral field spectroscopy capabilities with Low ($R = 1400$), intermediate ($R = 4000$) and high ($R = 30000$) to operate in the wavelength range $0.9\text{--}2.4 \mu\text{m}$.

Both, the imaging mode and IFS observing modes will use the same Teledyne $2\text{K}\times 2\text{K}$ detector. This instrument will be installed at Nasmyth B platform, behind the GTC Adaptive Optics system. FRIDA cryogenic opto-mechanical design of the optics building blocks and mechanisms are described in this contribution.

All FRIDA optical subsystems are based on CaF₂/S-FTM16 infrared cryogenic achromatic doublets. That doublets are the FRIDA “building block” of the optics. The ultimate optical performance is determined by the alignment of that doublet lenses and the integrity of the delicate CaF₂ glass lenses when the instrument is cooled down from room to cryogenical temperatures.

In Figure 1 we show a cut of the beam compressor opto-mechanics, which, working in concert with the medium camera optics, performs the coarse pixel size ($0.04''/\text{pixel}$). It can be noted this is a two doublets design, based on the FRIDA opto-mechanic “building block”.

In Figure 2 it is shown the FRIDA “building block” opto-mechanics prototype on the cold bench of one of the validation cryostats (FCTF). In the same cold bench it is mounted a diffraction grating for its cryogenical validation. Furthermore, it should be pointed out that two validation cryostats were developed by the CIDESI-UNAM team (FCTF and Colibrí) and are in operation.

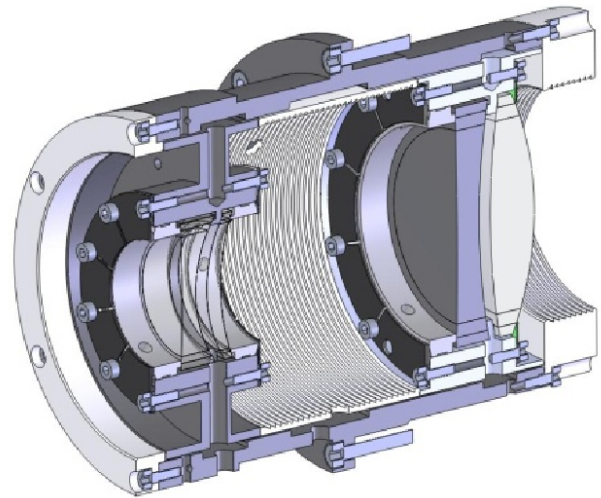


Fig. 1. Cut of the FRIDA beam compressor. This subsystem is formed by two achromatic doublets mounted on the opto-mechanics “building block”.

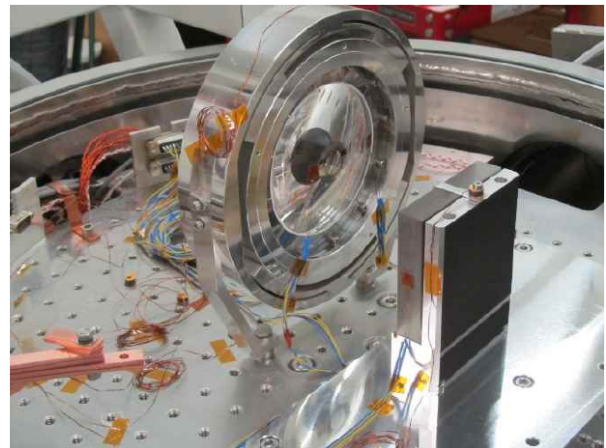


Fig. 2. Collimator prototype mounted on the cold bench of FCTF, one of the evaluation cryostats. A diffraction grating is also mounted on the cold bench for a cryogenical validation.

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