

# MEGARA Cryostat advanced design

## Multi Espectrógrafo en GTC de Alta Resolución para Astronomía

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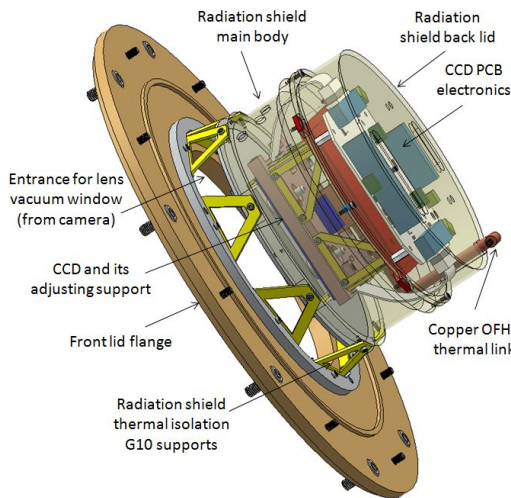
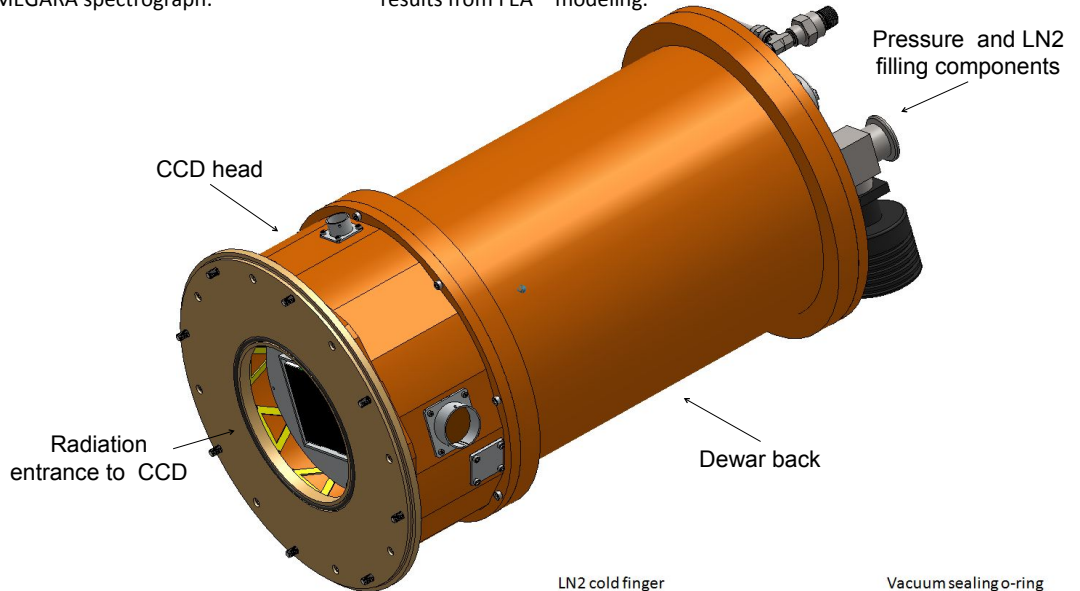
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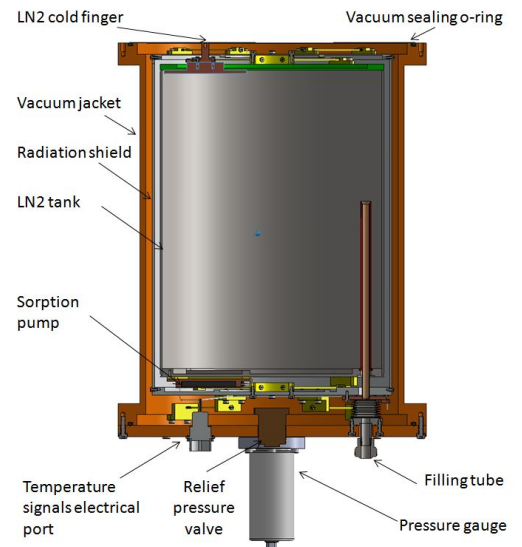
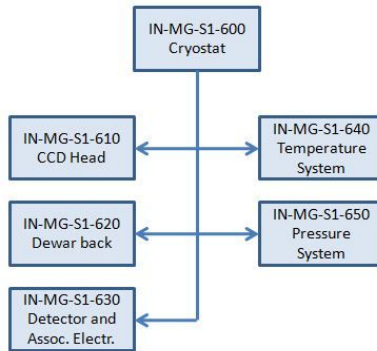
We present in this poster the advanced design of the MEGARA cryostat which is a custom made cryogenic device developed at the "Astronomical Instrumentation Lab for Millimeter Wavelengths" at INAOE<sup>5</sup>, Mexico; it will harbor the scientific CCD detector for the MEGARA spectrograph.

The proposed cryostat is an open cycle liquid nitrogen system, which offers flexibility and modular stages that allows easy adjusting for detector mounting. We show the parts involved in the design as well as results from FEA\* modeling.

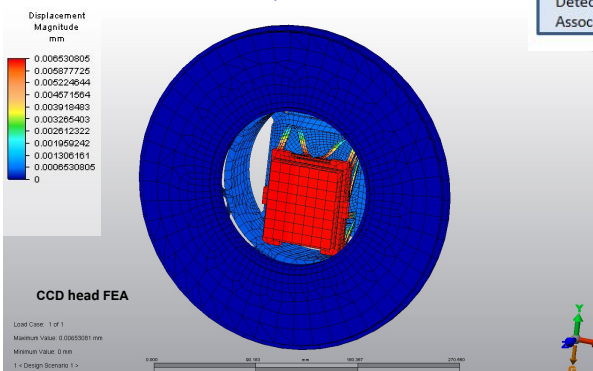
MAIN CHARACTERISTICS	
SPECIFICATION	VALUE
Cryostat provider	INAOE, Astronomical instrumentation lab for mm-λ
Cryostat type	Open cycle, filled with liquid nitrogen
Mass	23 kg
Dimensions	300 mm diameter / 570 mm max. length
LN2 tank volume	7.3 lts (7 lts usable)
Estimated LN2 hold time	>40 hours
Vacuum requirement	≤ 4·10 <sup>-6</sup> mbar
Vacuum flanges	Commercial KF 25 flanges, fittings and valves
Sorption pump	Custom design / Active charcoal



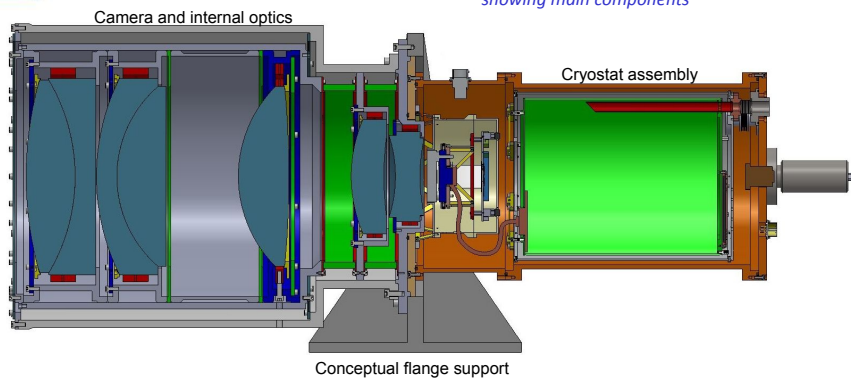
MEGARA cryostat is integrated by five sub-systems: CCD head and Dewar back are the cryostat main body components; temperature and pressure systems includes all sensors and associated controllers. Detector & associated electronics includes the CCD and the in-vacuum electronics to protect the CCD.



MEGARA cryostat dewar back cross section view showing main components



\*Finite element analysis (FEA) has been performed on the CCD head to find maximum displacements of the detector. For the case of a stationary cryostat, as it is the case of MEGARA, the analysis results show that the maximum displacement magnitude is 6 μm.



MEGARA cryostat mounted in support attached to spectrograph camera (cross section view)

