



IUCAA TELESCOPE & INSTRUMENTATION

IUCAA Girawali Observatory (IGO)

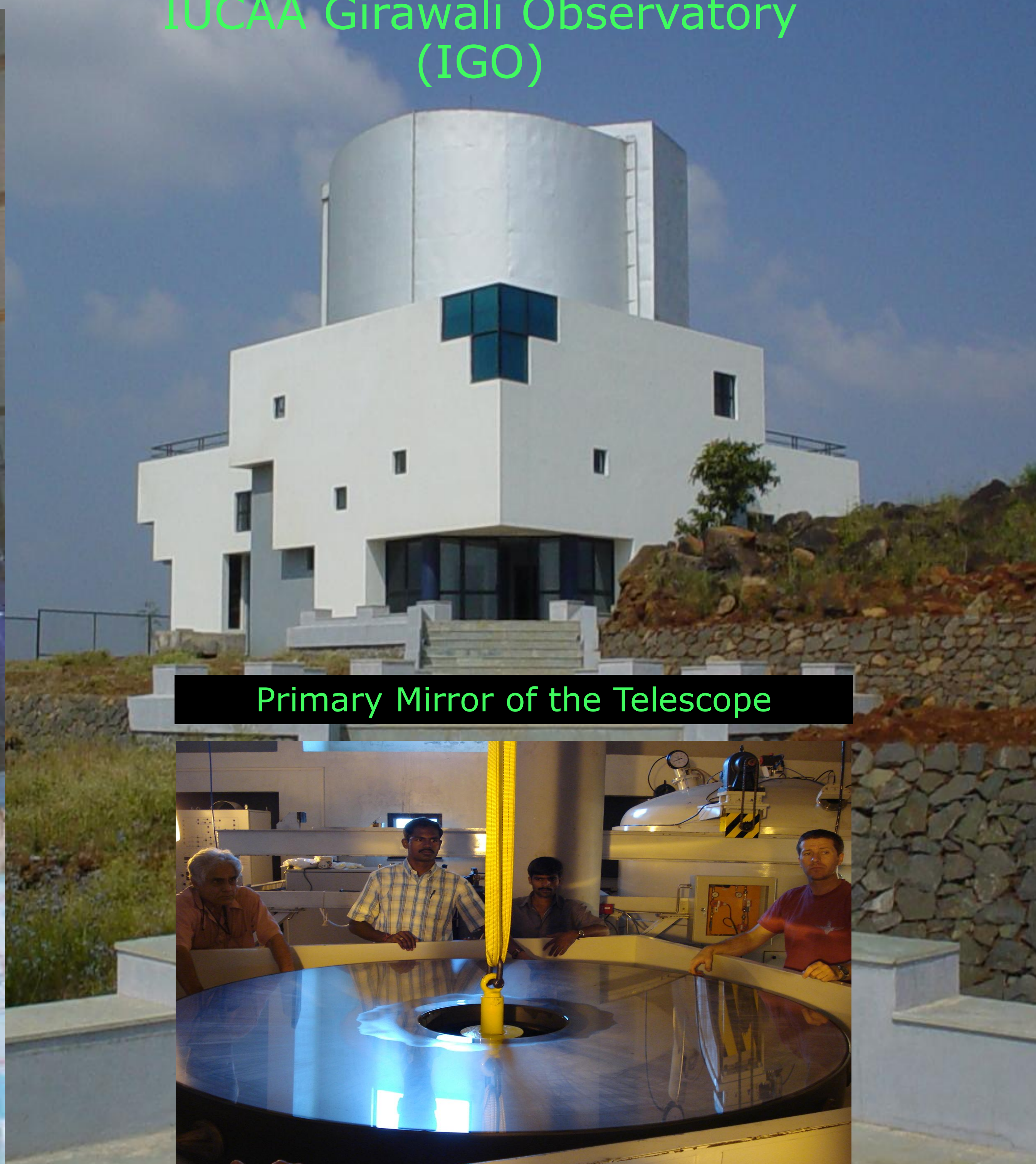
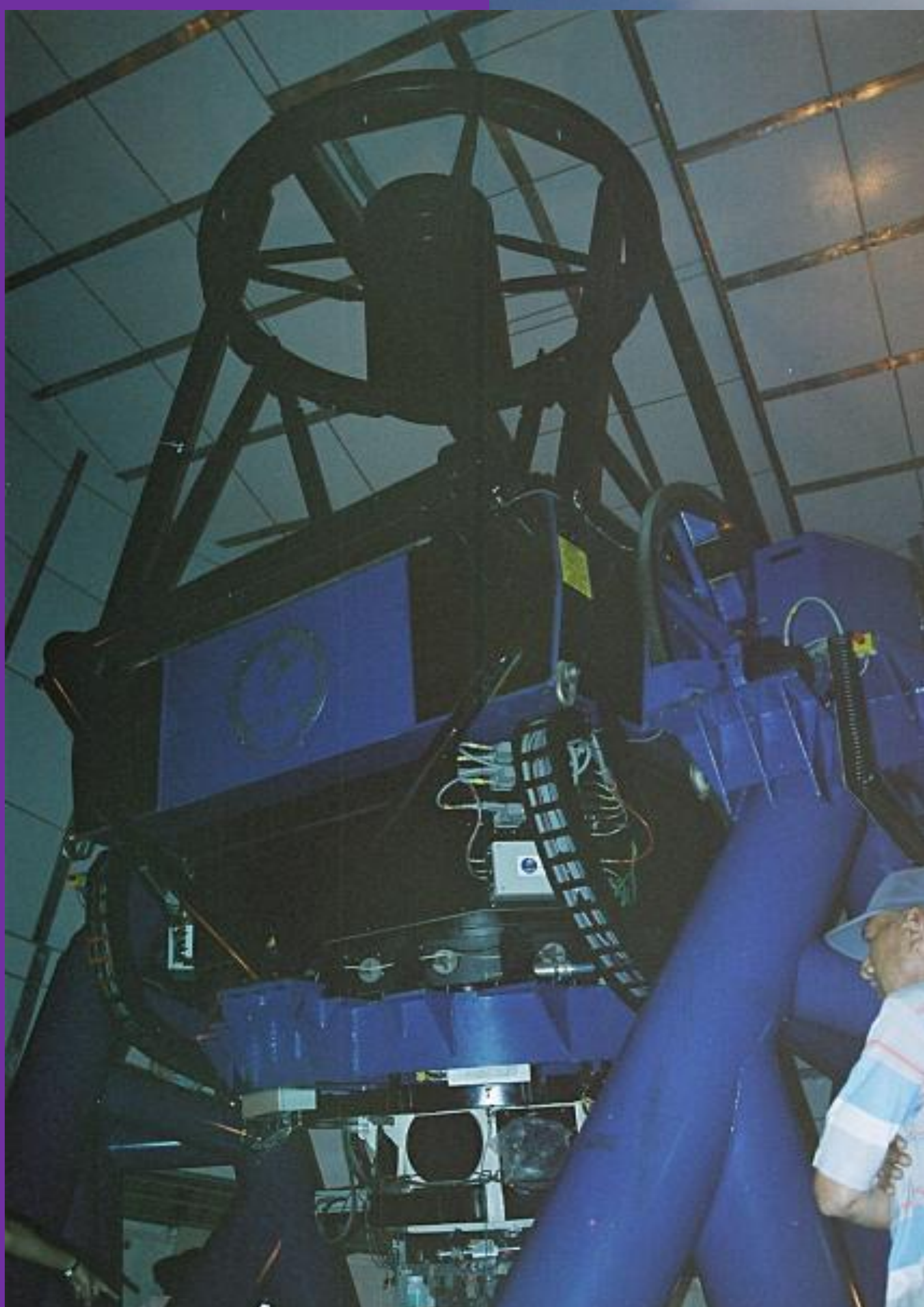
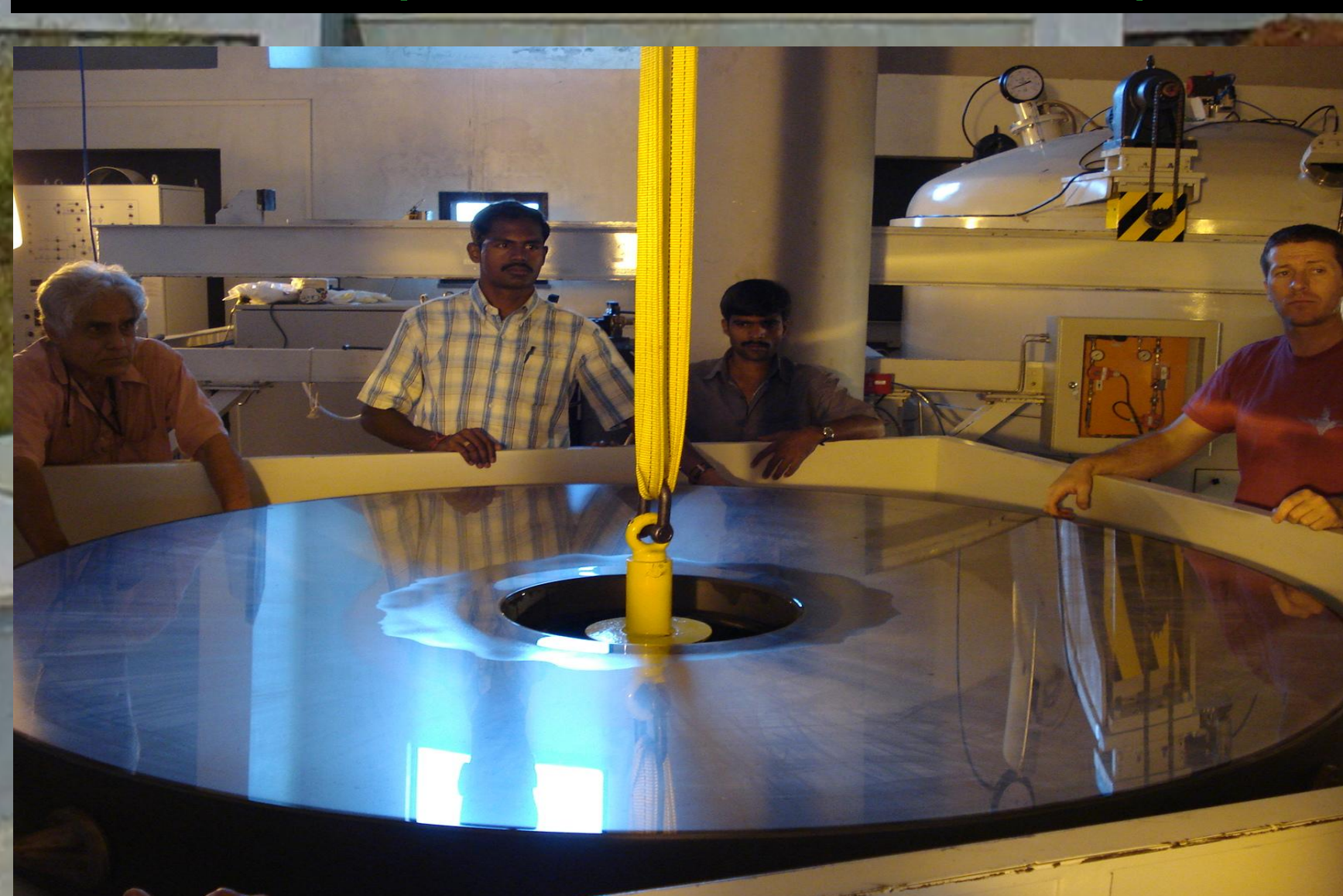
Observatory Control Room



Mirror Coating Plant



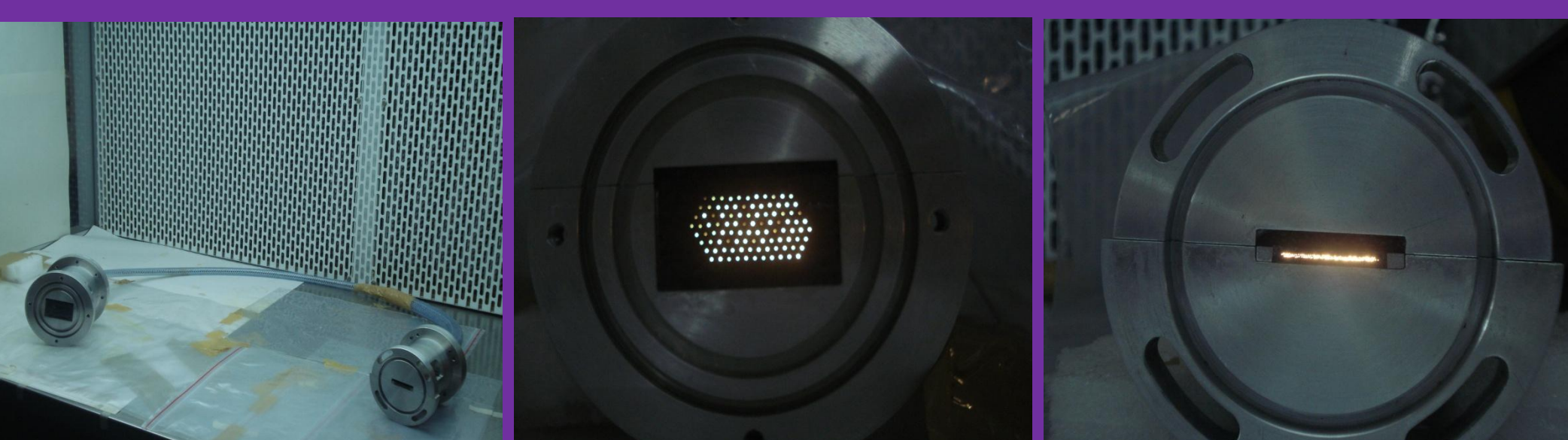
Primary Mirror of the Telescope



Instrumentation R&D at IUCAA

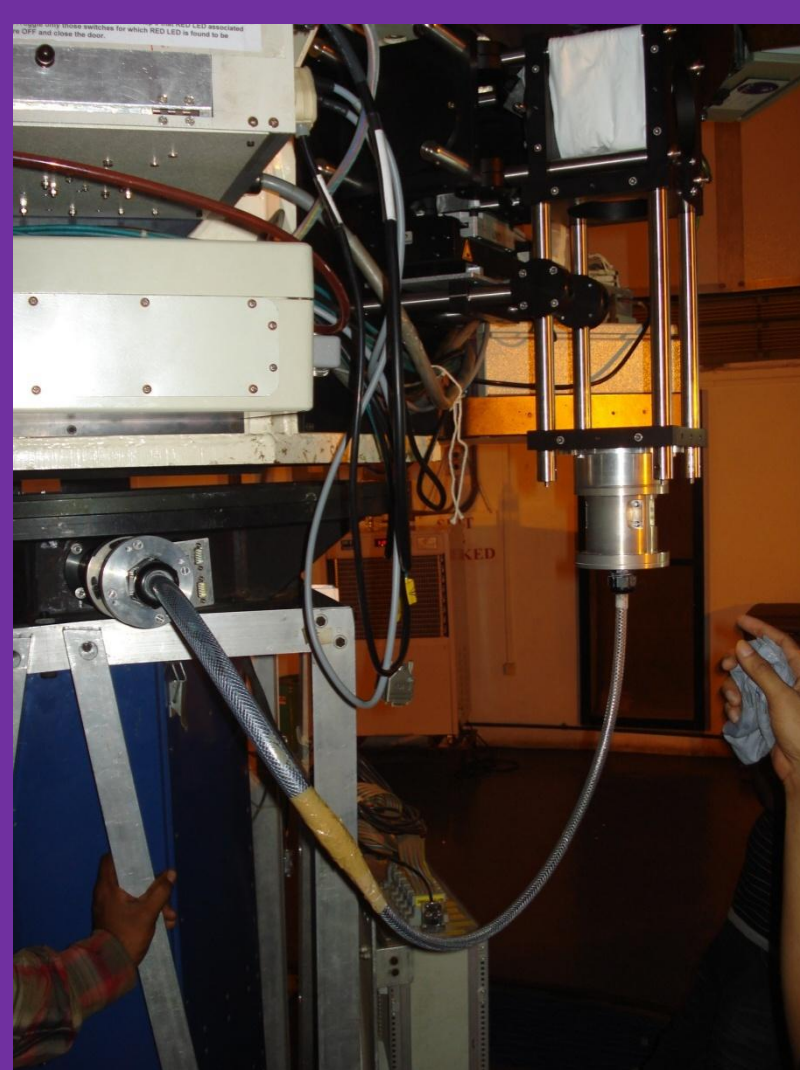
Integral Field Unit (IFU)

An **Optical Fibre based IFU** has been developed to provide 2-D Spectroscopic facility at IUCAA Telescope with IFOSC. A 2-D area of an astronomical object can be sampled by optical fibres and fed to IFOSC to record 100 spectra in one observation.

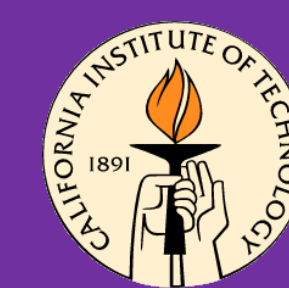
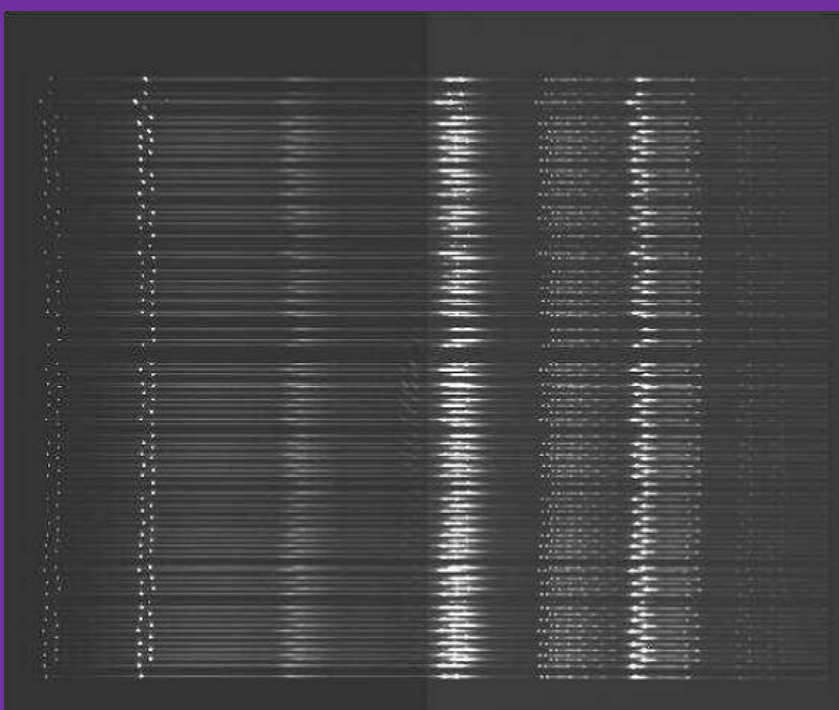


IFU Fibre Unit IFU's Illuminated Front end IFU's Illuminated Back end

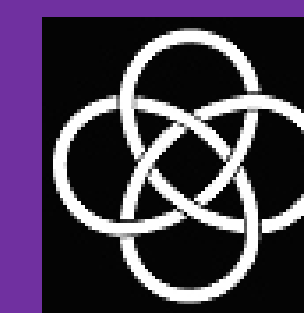
An example of multiple spectra taken through the IFU when used with IFOSC. IFU extends ~ 13 X 7 arc-seconds on the sky. A variety of extended astronomical object can be studied through IFU e.g. galaxies, planetary nebulae, supernova remnants etc.



IFU mounted on IUCAA Telescope. Along with optical fibers several other optical elements has been used to couple IFU to the Telescope and to IFOSC.



ROBO-AO



A collaboration between IUCAA & Caltech

Rapidly develop & deploy low cost Adaptive optics (AO) system for 1-3 m class telescopes:

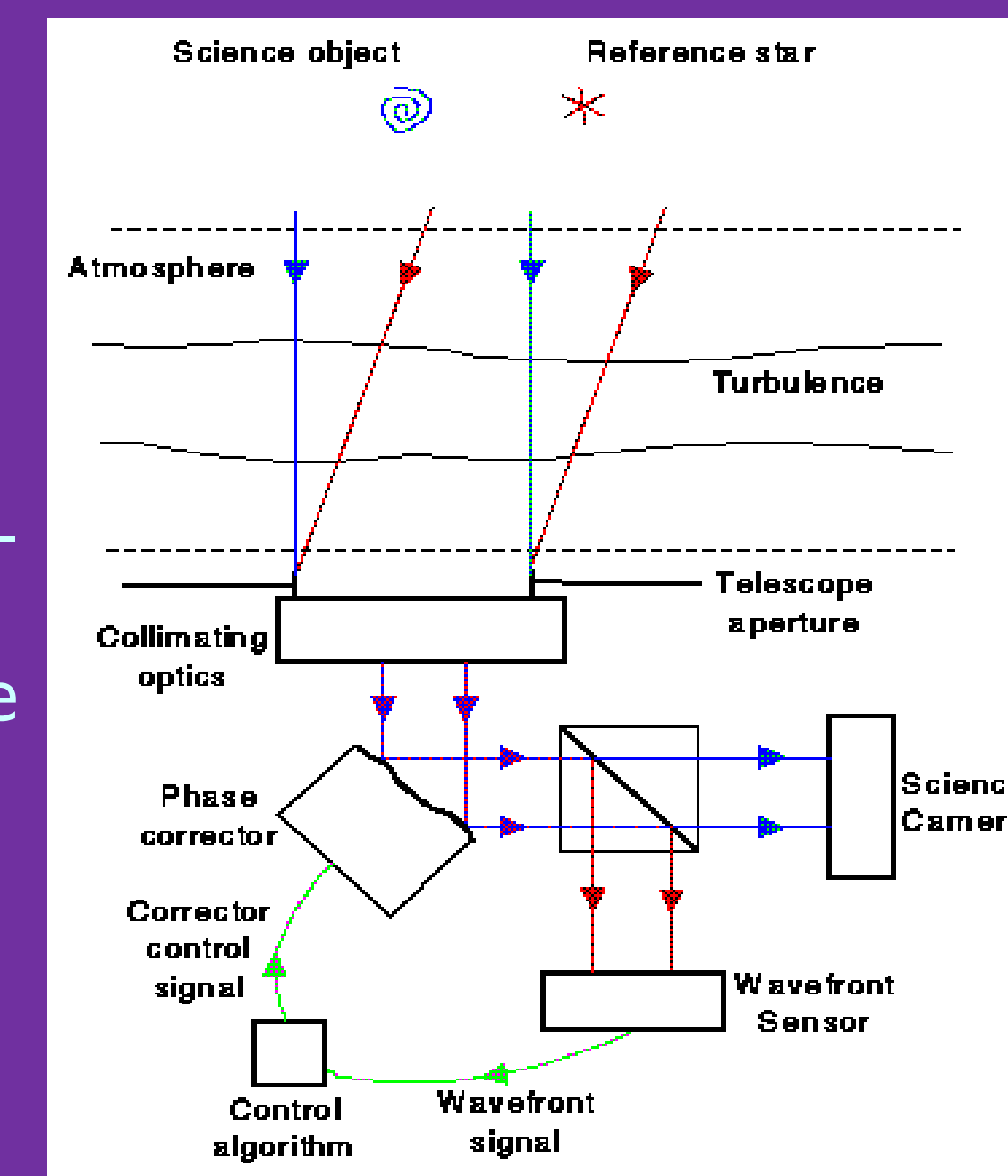
- Use low risk technologies
- Ease of use, fully robotic
- Emphasis on high observing efficiency

New astronomical science capability:

- Allocate large amount of time to diffraction-limited astronomy, previously not possible
- Integrated visible & near IR science instruments

AO basics:

- In ground-based optical telescopes, a blurring effect is introduced due to turbulence in the Earth's atmosphere.
- Adaptive optics (AO) techniques measure and compensate for the degrading effect of the atmosphere in real time and at least partially recover the image quality.
- For determining the atmospheric effects, a reference object (suitably bright star) sufficiently close to observational target is needed.
- Now a days, conveniently, astronomers use artificial guide stars (firing laser beacons from the telescope into the atmosphere) as reference objects.

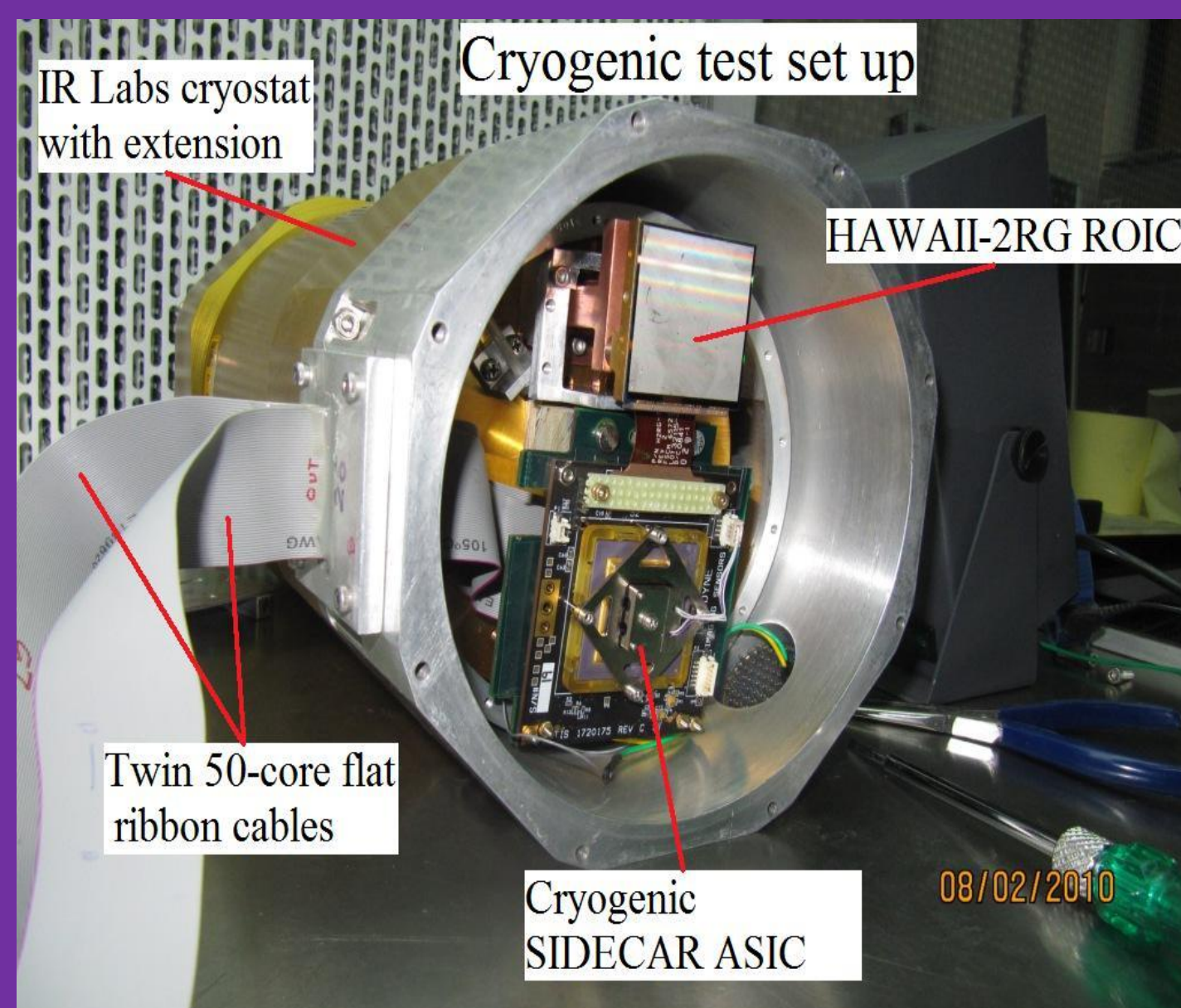


HAWAII-2RG Near-Infrared Detector Control and Data Acquisition System

H2RG – Near-Infrared Detector with 2K x 2K pixels
SIDE CAR ASIC - Complete Controller on a chip for H2RG

Main Features :

- SIDE CAR based (compact , low power/noise , cryogenic)
- Fast USB 2.0 interface (with fiber interface)
- Built around very powerful Vitex-5 FPGA –High Speed, On chip memory & DSP, supports all standard PC interfaces



- Platform independent software –tested on different flavors of Linux and Windows
- Fully compatible with Teledyne supplied H2RG firmware
- Can be quickly tuned to work with other similar detectors like H1RG, H4RG, etc.

It is being integrated in spectrograph for 11 m diameter South African Large Telescope (SALT).

