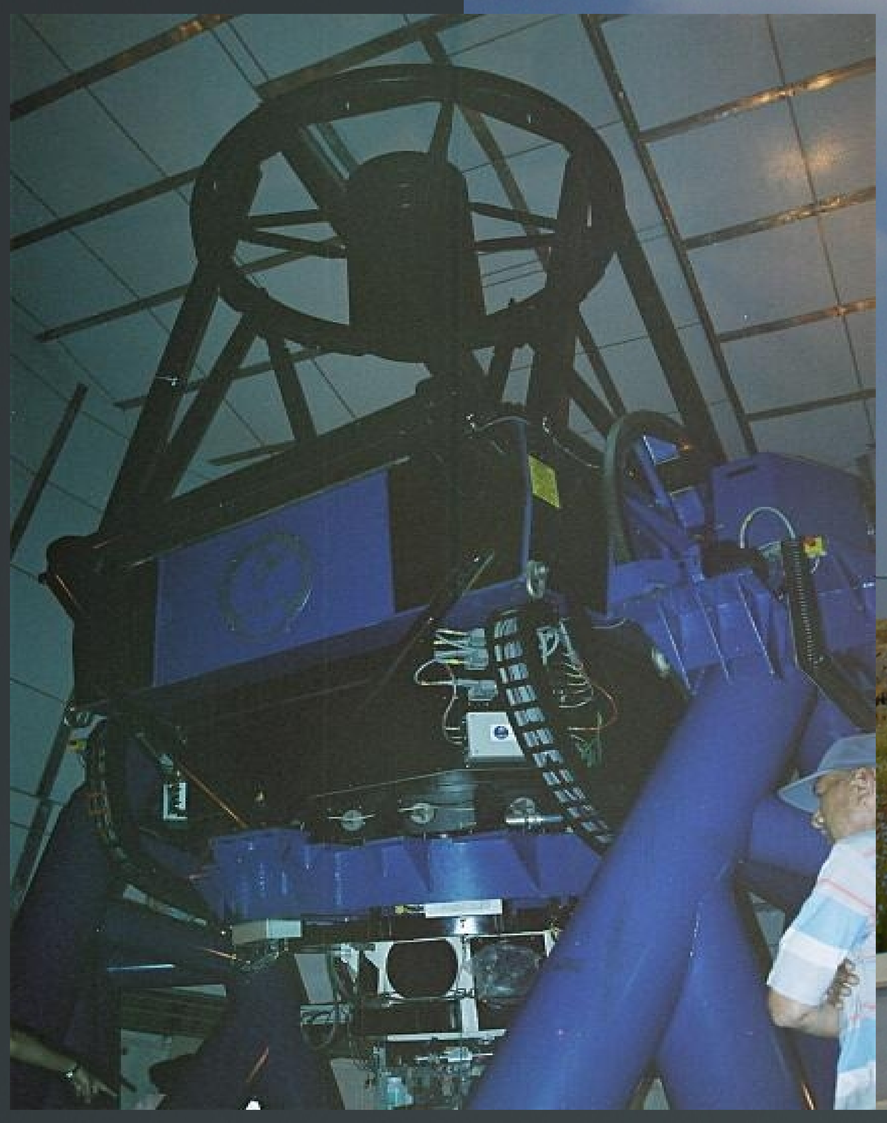
IUCAA TELESCOPE & INSTRUMENTATION



IUCAA Girawali Observatory (IGO)

Primary Mirror of the Telescope

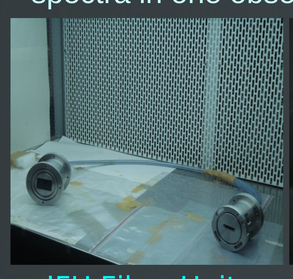
Observatory Control Room

Mirror Coating Plant

Instrumentation R&D at IUCAA

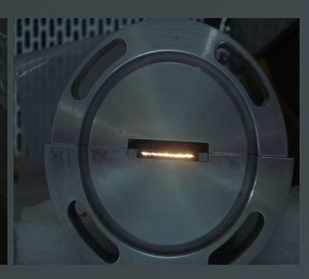
Integral Field Unit (IFU)

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.

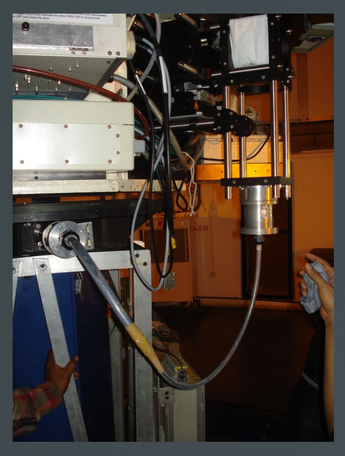


IFU Fibre Unit

IFU's Illuminated Front end

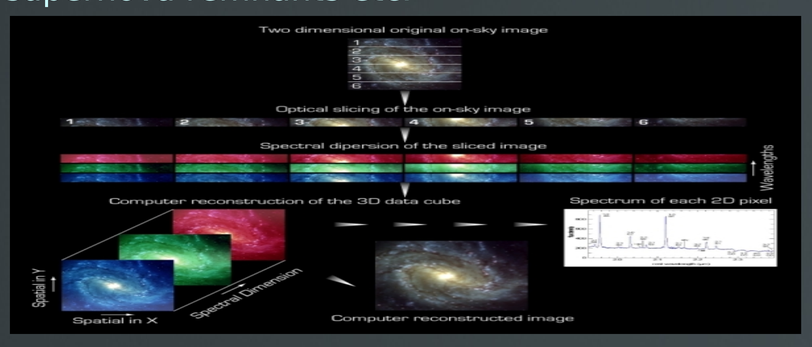


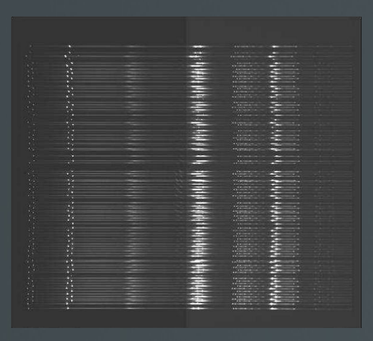
IFU's Illuminated Back end



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.

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.





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

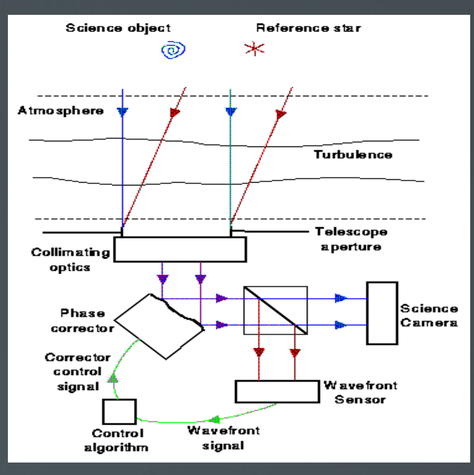
AO Basics

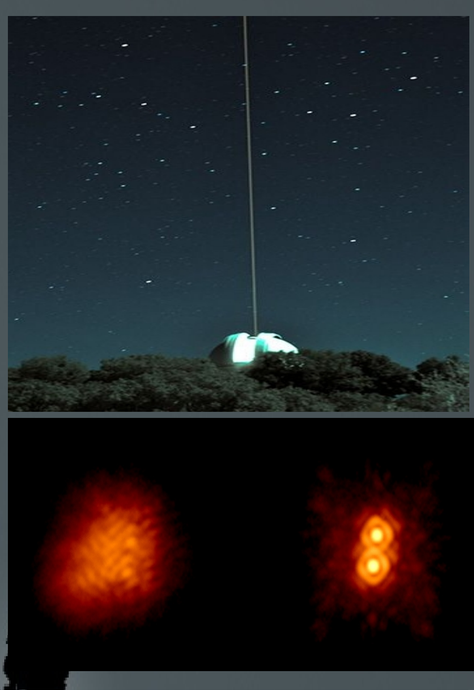
- In ground-based optical telescopes, a blurring effect is introduced due to turbulence in the Earth's atmosphere.

- 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.
- To correct for the atmospheric effect a bright object close to the star is chosen for reference.

- Now a days, conveniently, astronomers use artificial guide stars (firing laser beacons from the telescope into the atmosphere) as reference objects.

- The image on the bottom-left shows the resolution obtained using adaptive optics compared to the normal one. The two objects are well resolved in the AO-corrected image.

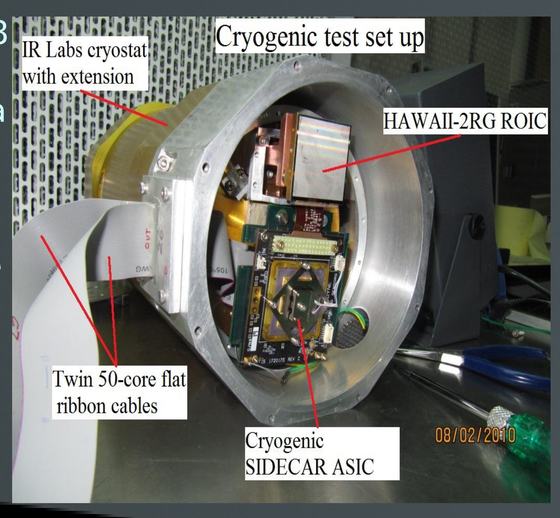




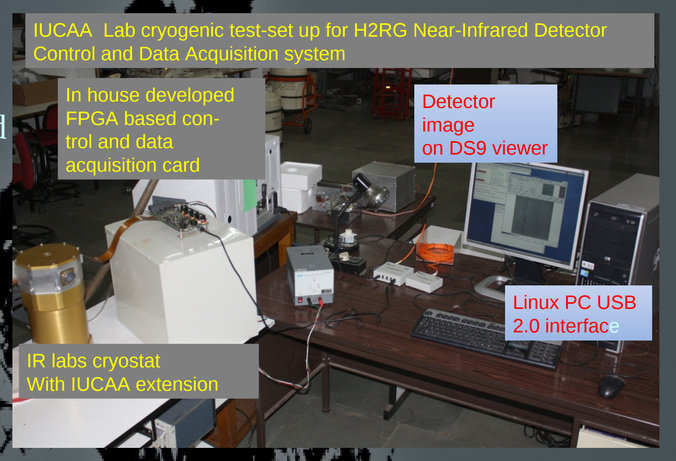
HAWAII-2RG Near-Infrared Detector Control and Data Acquisition System

H2RG – Near-Infrared Detector with 2048 x 2048 pixels
SIDECAR ASIC - Complete Controller on a chip for H2RG

Main Features :
- SIDECAR based (compact , low power/noise and 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).