Subaru Instruments

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Instrument Division
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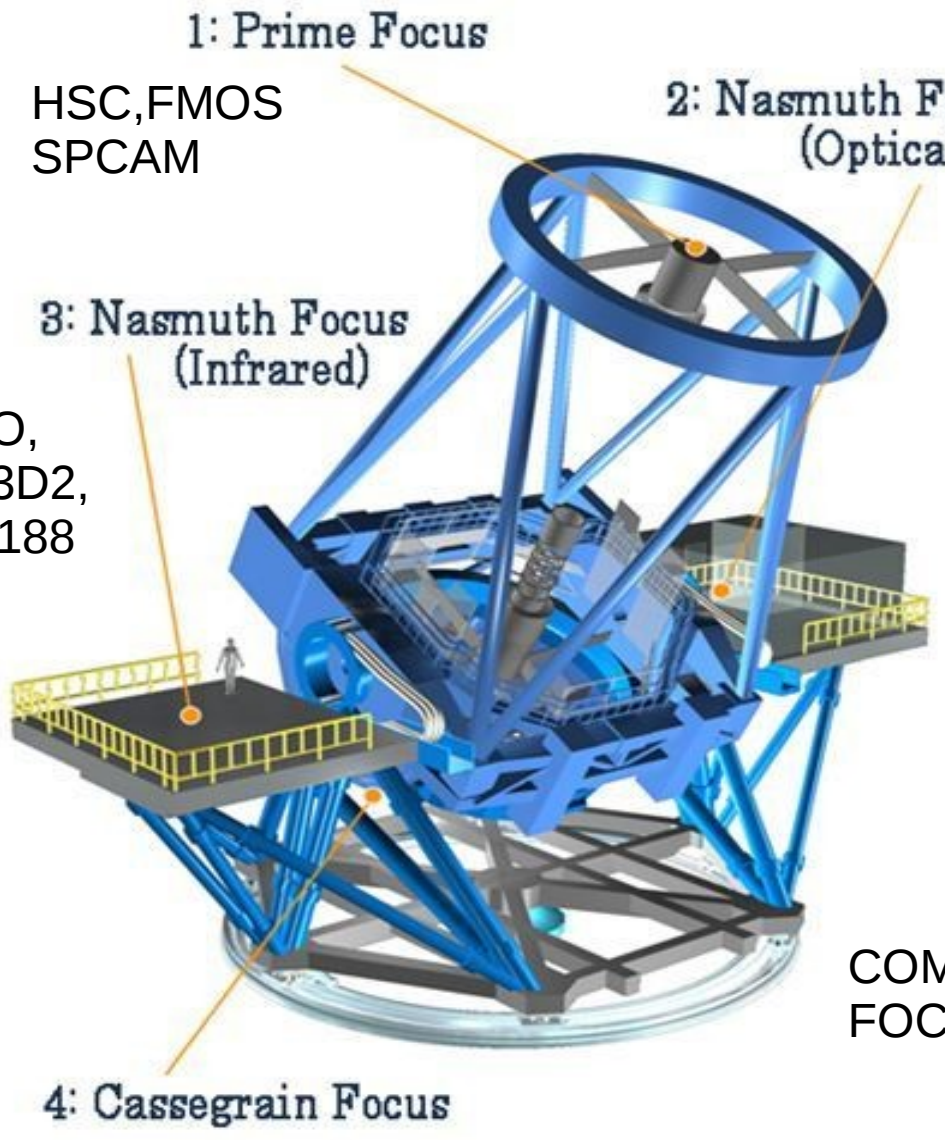
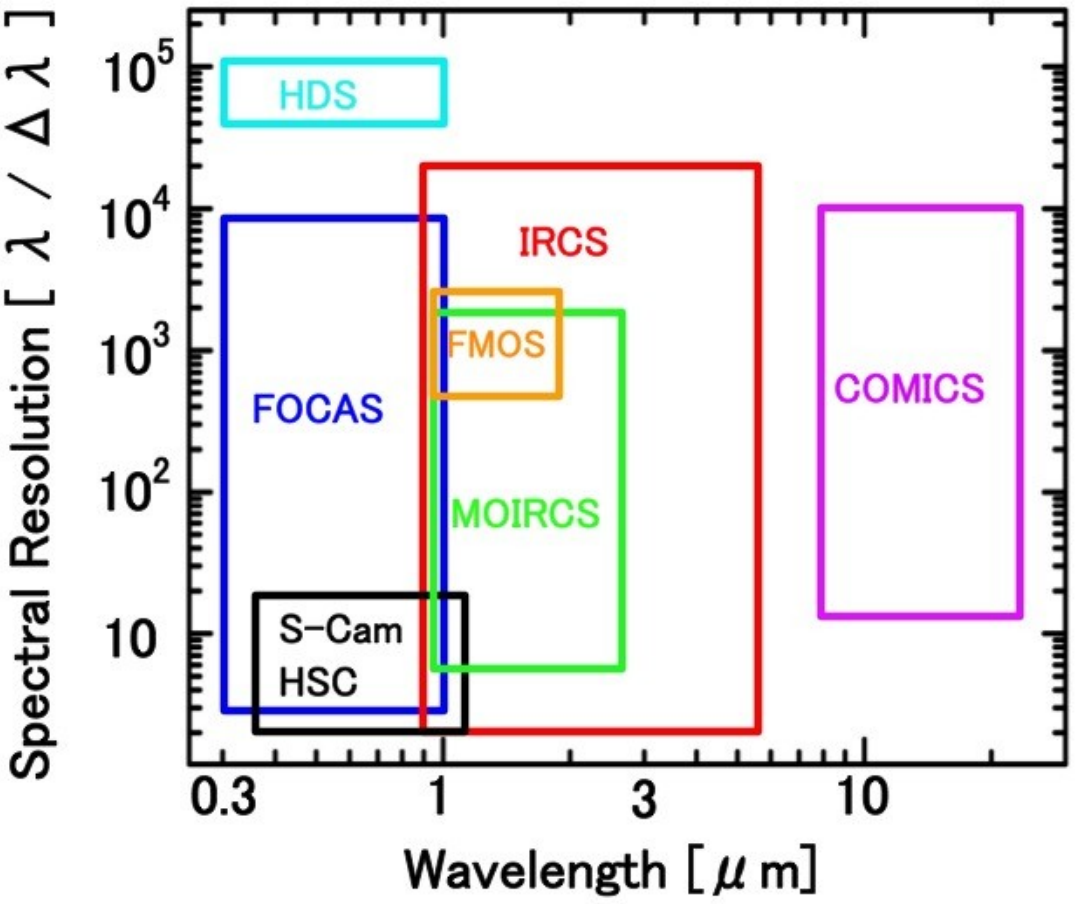
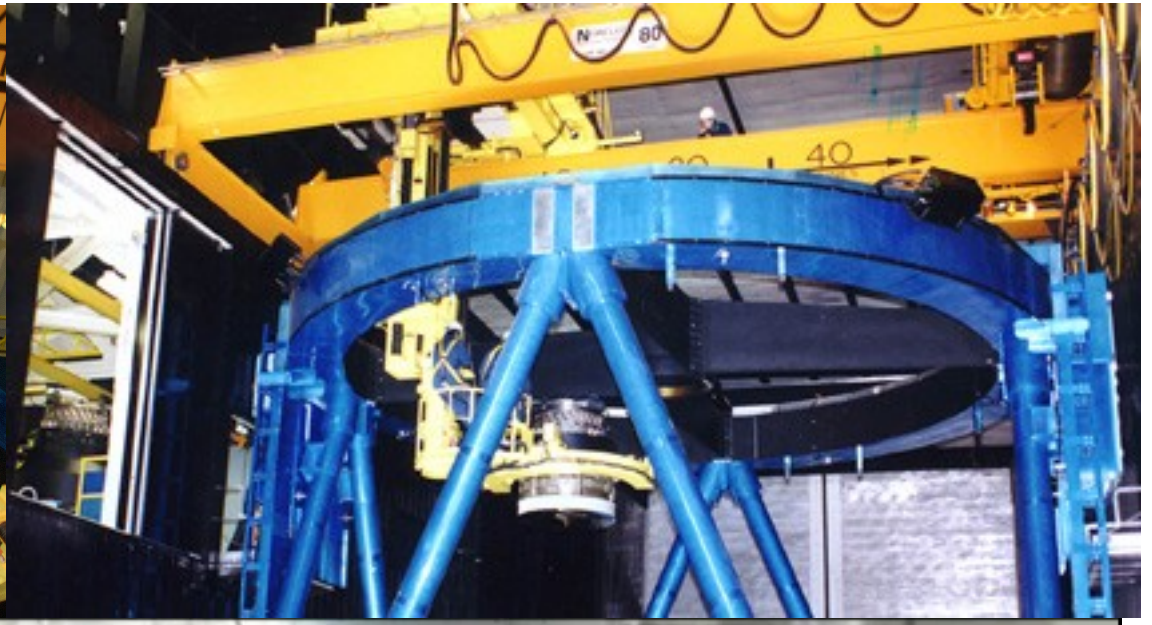
Instruments



Instrument coverage



Prime Focus

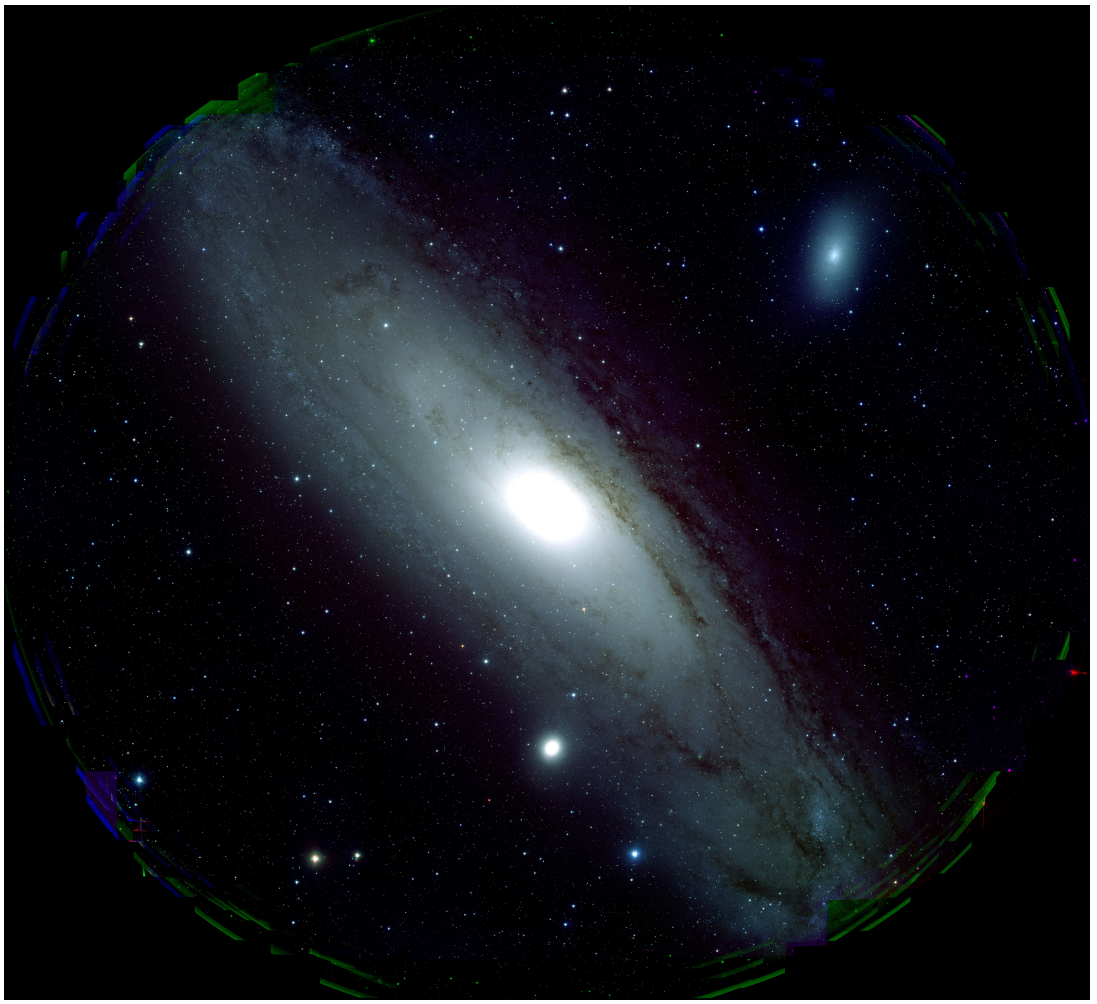


SuprimeCam

- 80 megapixel prime focus camera.
- 50% of scientific papers from Subaru to date.
- 34’ x 27’ field of view (largest in 8-10m-class telescopes, until HSC).
- 9 broadband and 4 narrowband filters.

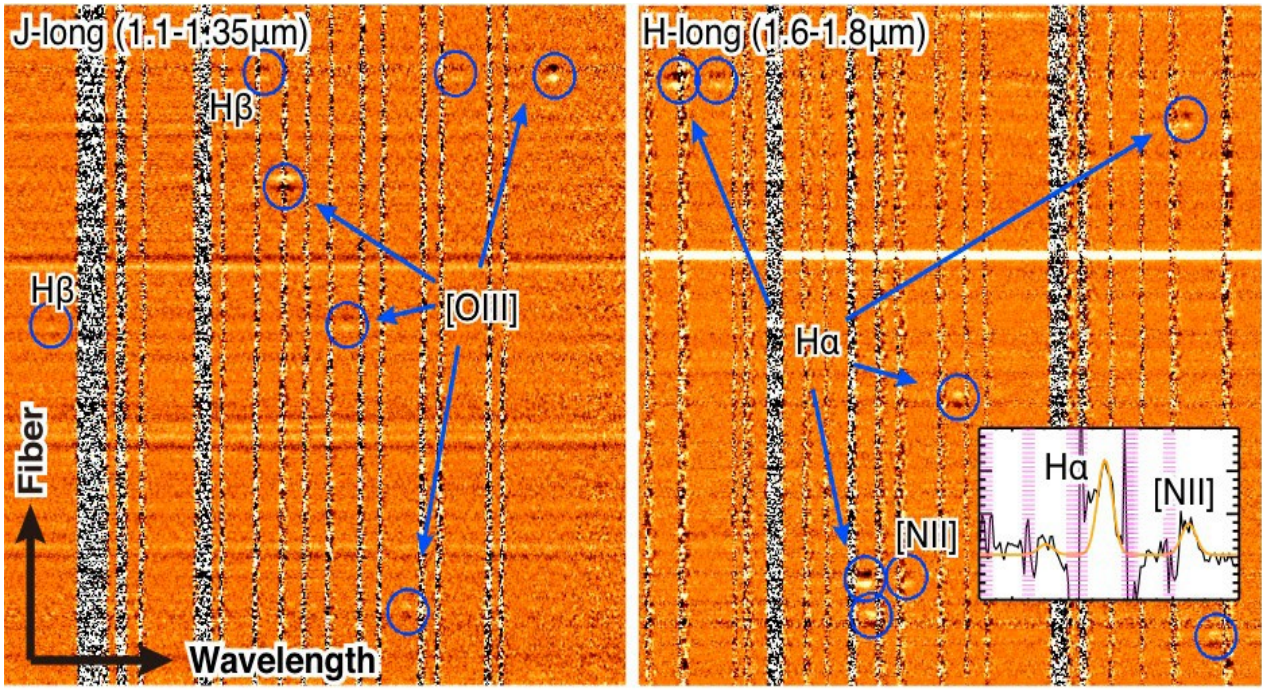
Hyper-SuprimeCam

- First light Jan 2013, open-use starting this March.
- 1.5deg field of view.
- Limited selection of broadband filters at present.

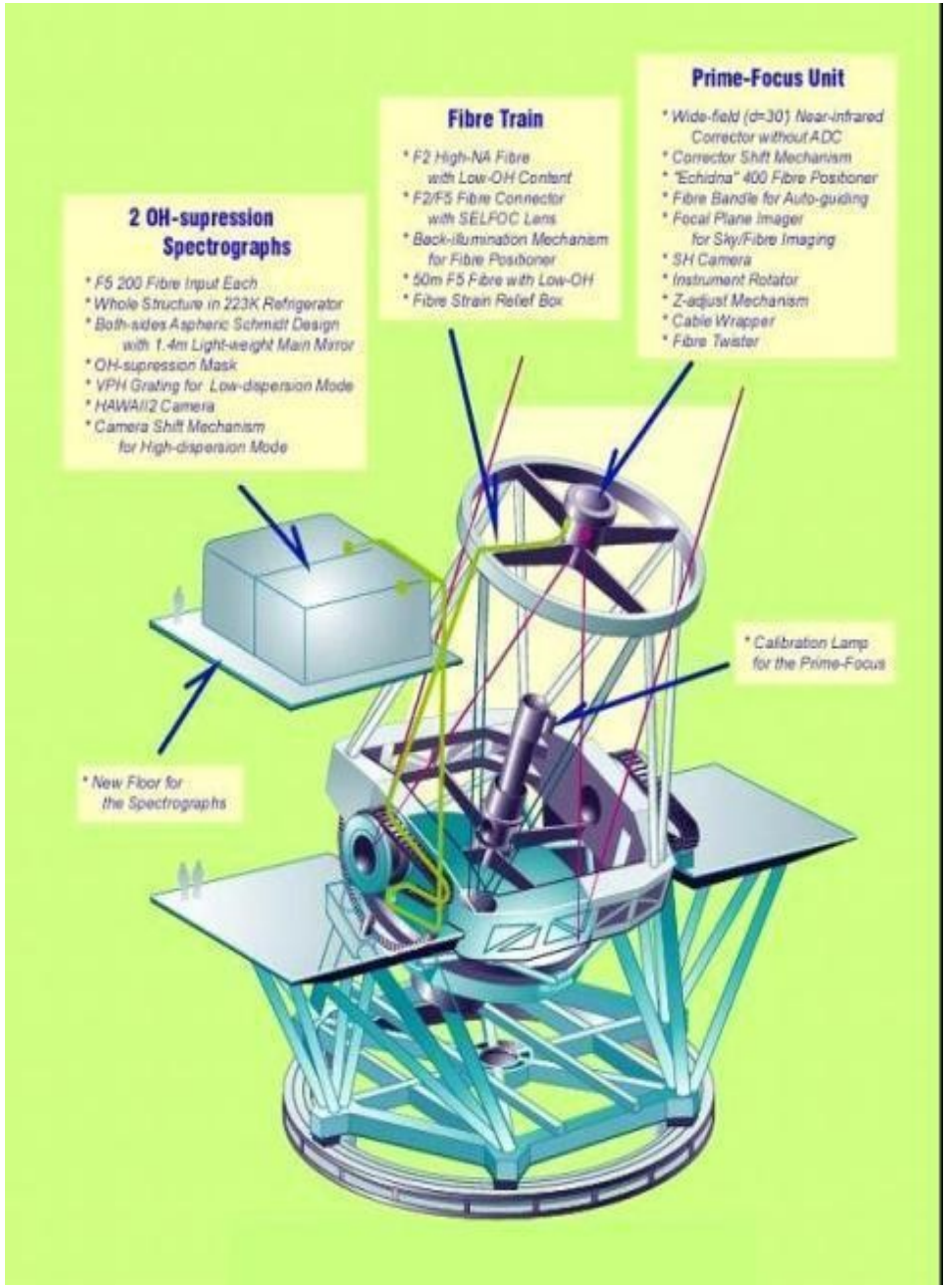


Fibre-fed Multi-Object Spectrograph

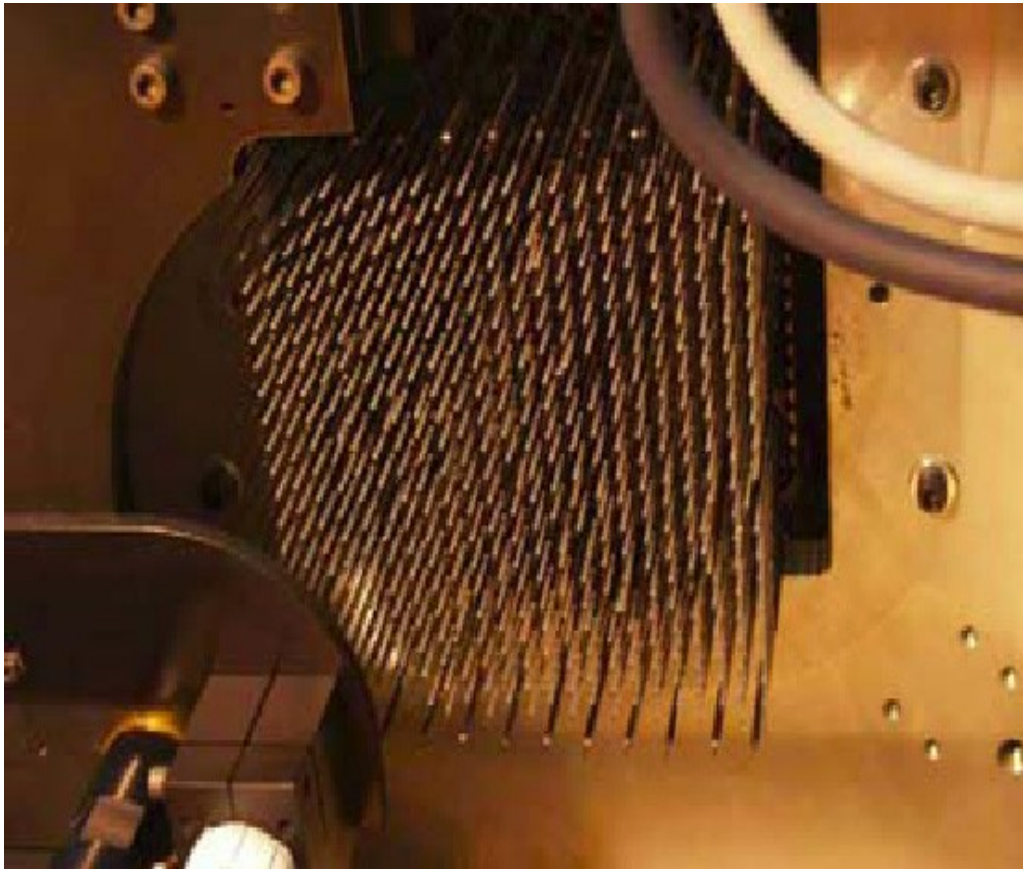
- Prime focus near-IR (J and H band) multi-object spectrograph
- 400 target-able fibres across a 30' diameter FOV
- Spectral resolution: R=600 or R=2200 modes.



FMOS subsystems

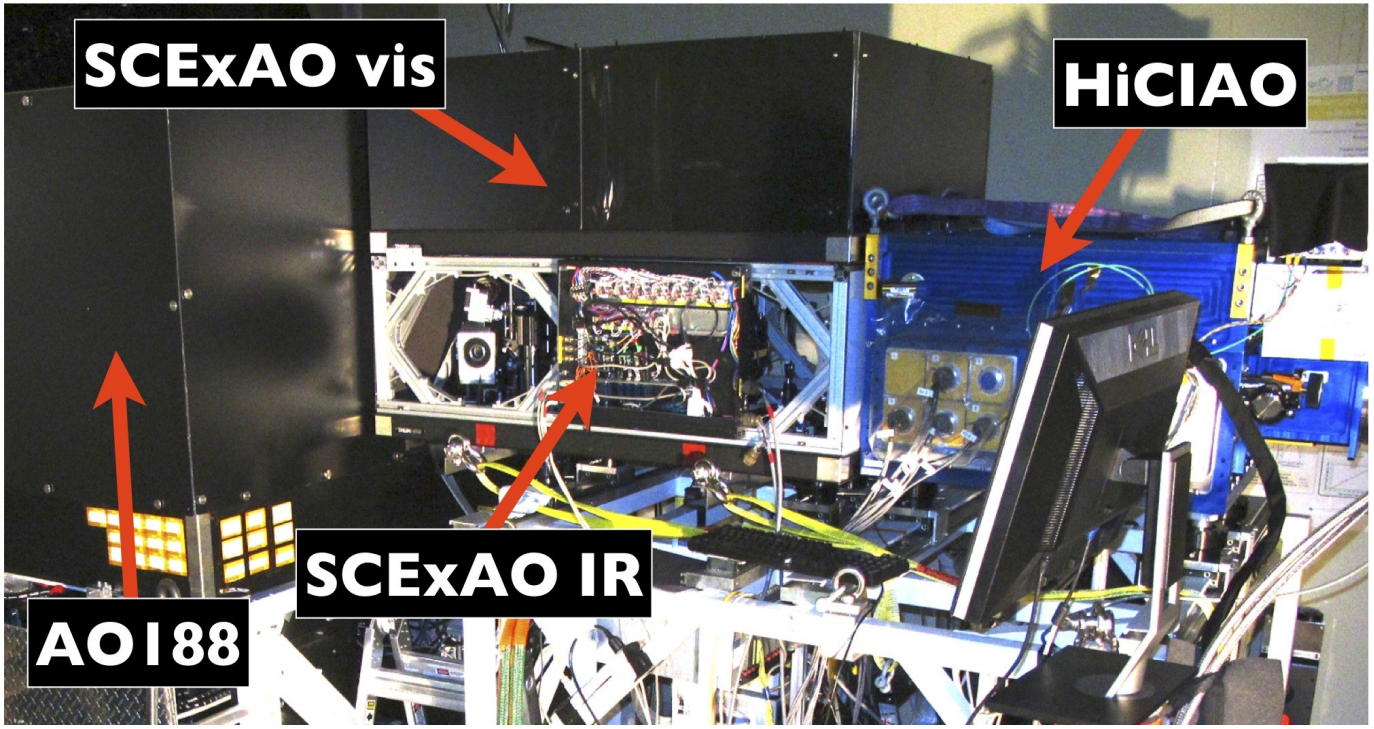


Echidna spines



Nasmyth-IR

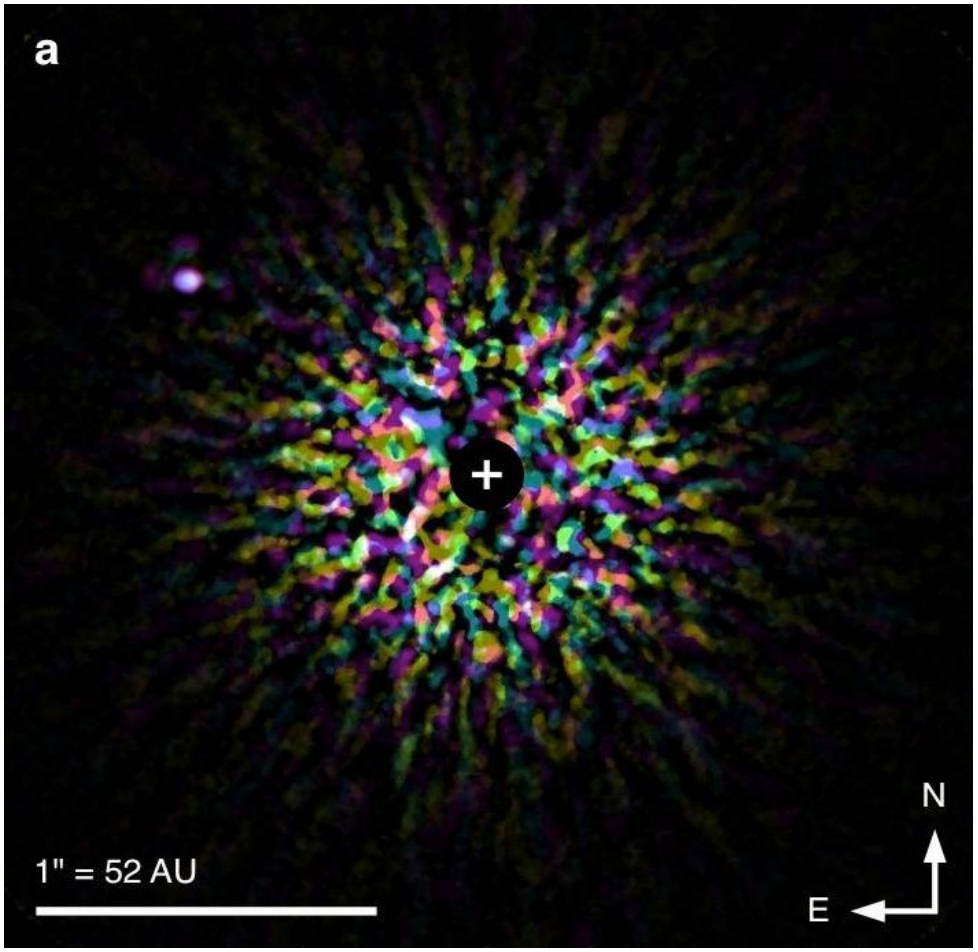
AO188-IRCS



AO188

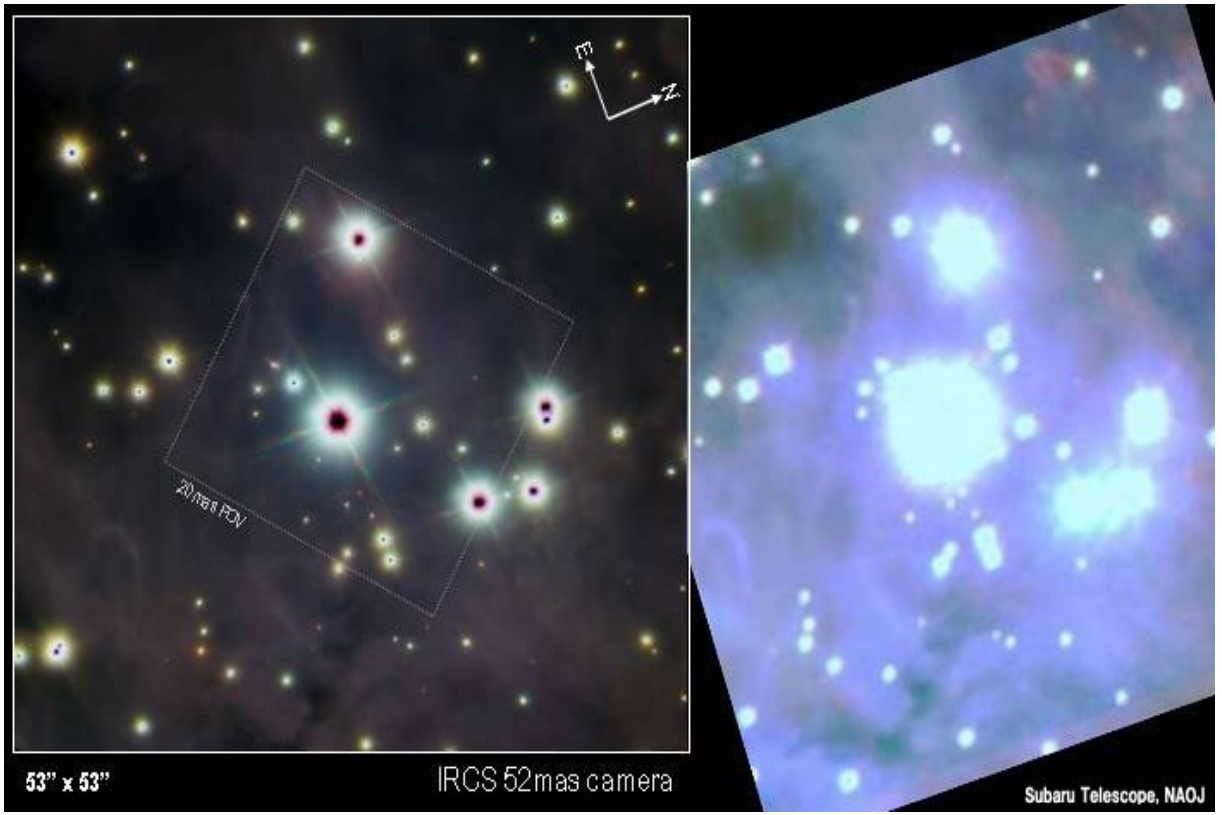
- 188-element near-IR adaptive-optics, used with NsIR instruments (IRCS, HiCIAO, Kyoto3DII).

- Natural- and Laser Guide Star operation.
- Low throughput loss and emissivity in normal use.



IRCS

- Near-IR imaging and spectroscopy (0.9 to 5 microns)
- Can be used with or without AO correction
- FOV 12-54" depending on mode chosen
- Spectral resolution R=50 to 1950 depending on mode
- Pixel Scale 12-52 mas/pix (well suited to AO observations)
- New Grism Spectro-polarimetry later this year.

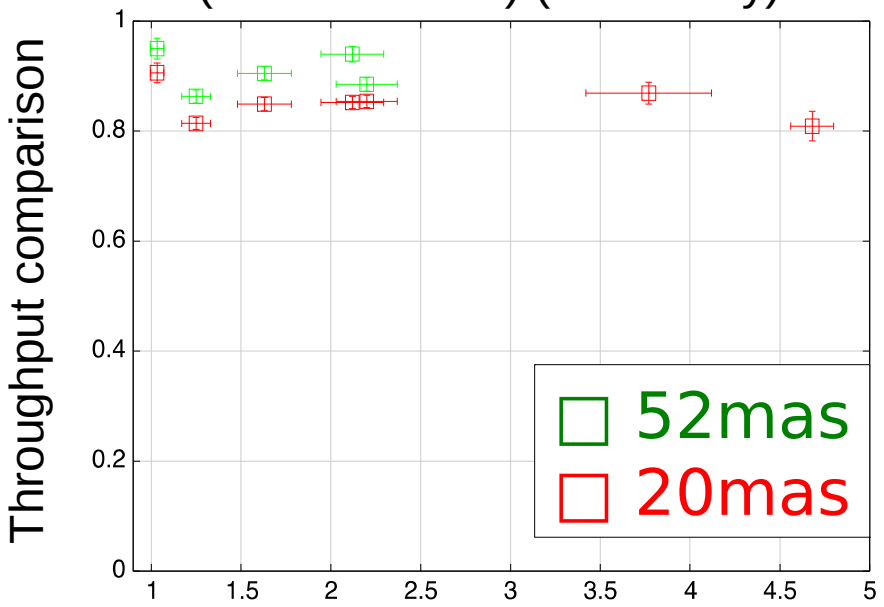


IRCS-AO188 throughput and emissivity

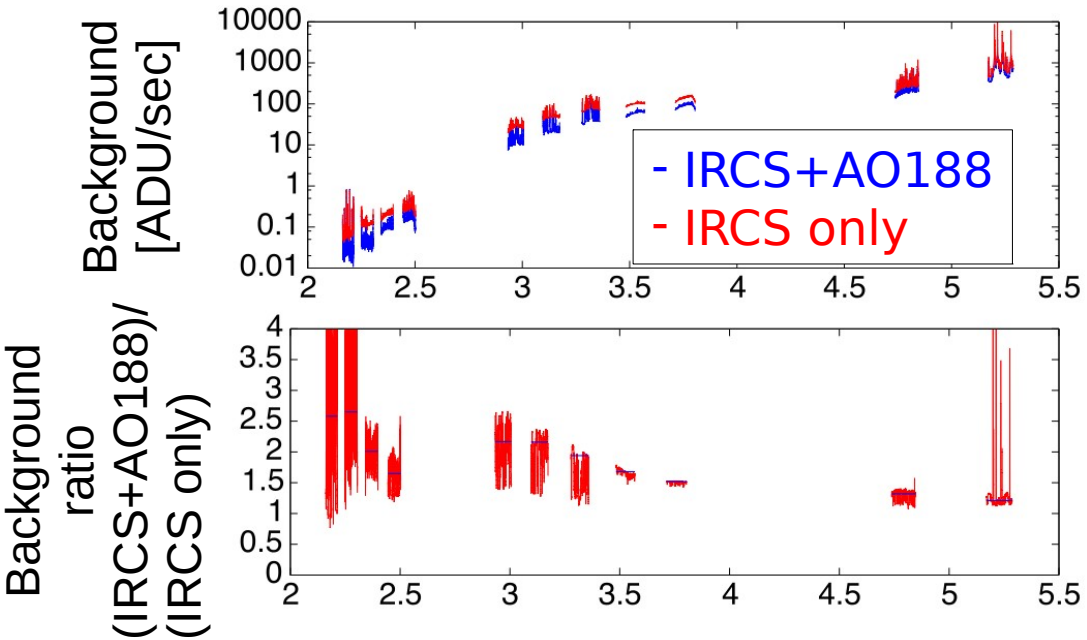
To clarify the constraint for using IRCS only (replacing AO188 bench with NsIR Image rotator in optical path), throughput loss and emissivity increase due to AO188 optics compared to IRCS only was directly measured from on-sky data obtained in the same photometric night for both IRCS+AO188 and IRCS-only.

Throughput

(IRCS+AO188)/(IRCS only)



Background

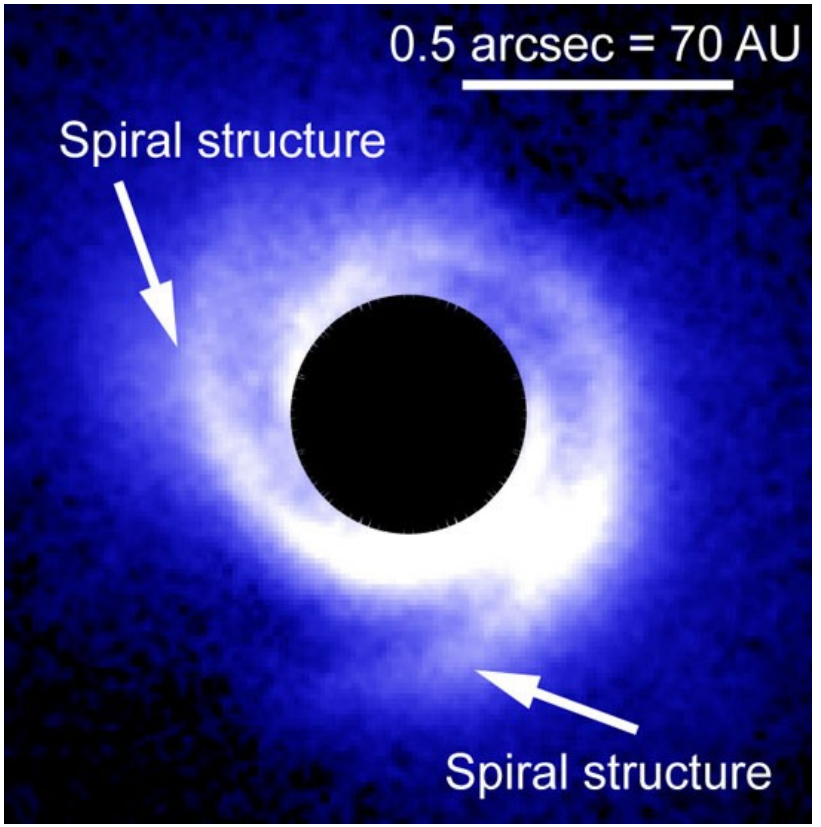


(IRCS+AO188 throughput) = 0.85 x (IRCS only throughput)

(IRCS+AO188 background) = 1.5-2.0 x (IRCS only background)

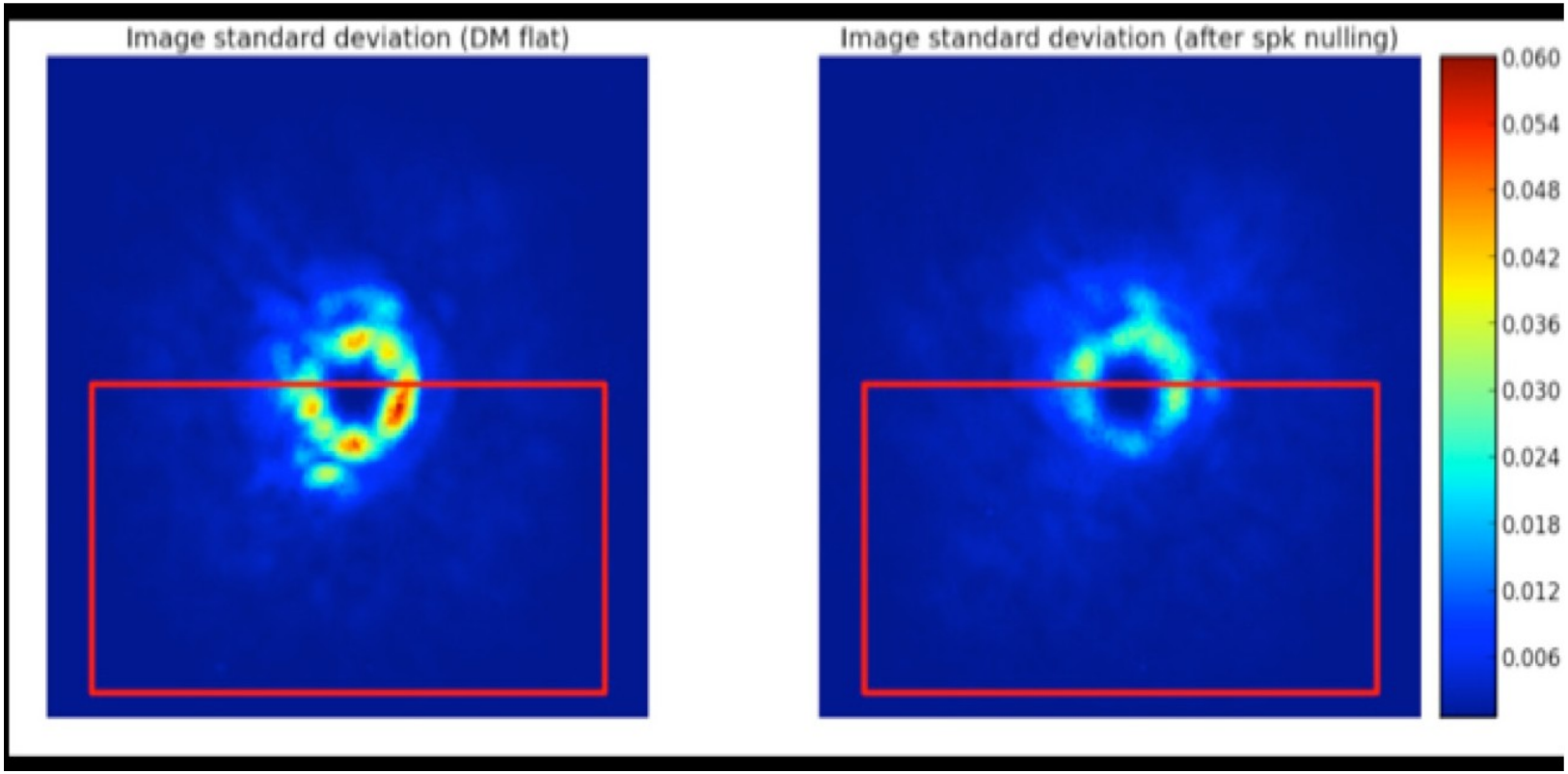
HiCIAO

- High Contrast Instrument for AO at NsIR, first light 2007.
- Images faint objects near to bright central star.
- “Visiting”, PI-type instrument.
- Achieves sharp PSF using AO-188 adaptive optics.
- 20”x20” FoV in normal imaging mode.



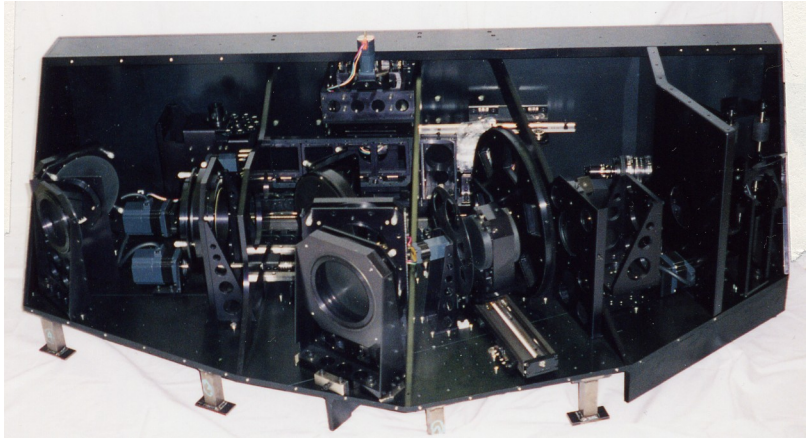
SCExAO

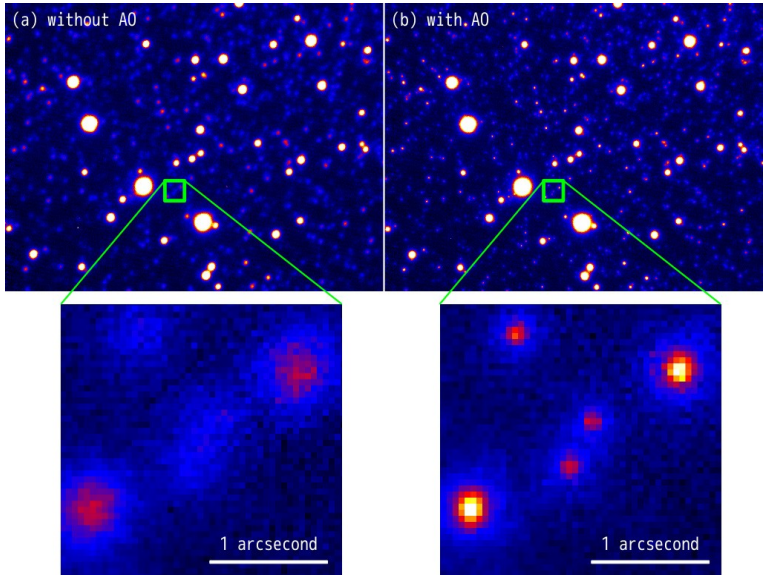
- Subaru Extreme Adaptive Optics: high performance coronagraph and series of wavefront control solutions
- PI-type instrument.



Kyoto 3DII

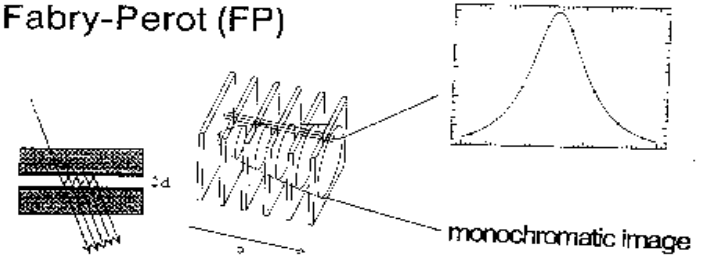
Optical multi-mode tri-dimensional spectrograph



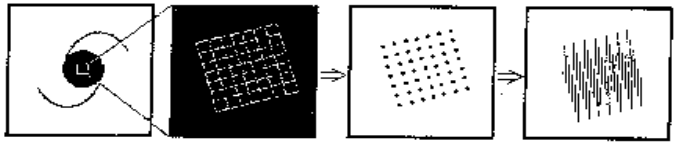


◆OBSERVATIONAL MODES

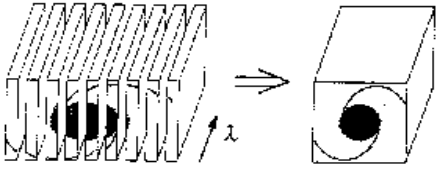
(1) Fabry-Perot (FP)



(2) Integral field spectrograph (IFS) with microlens array (MLA)



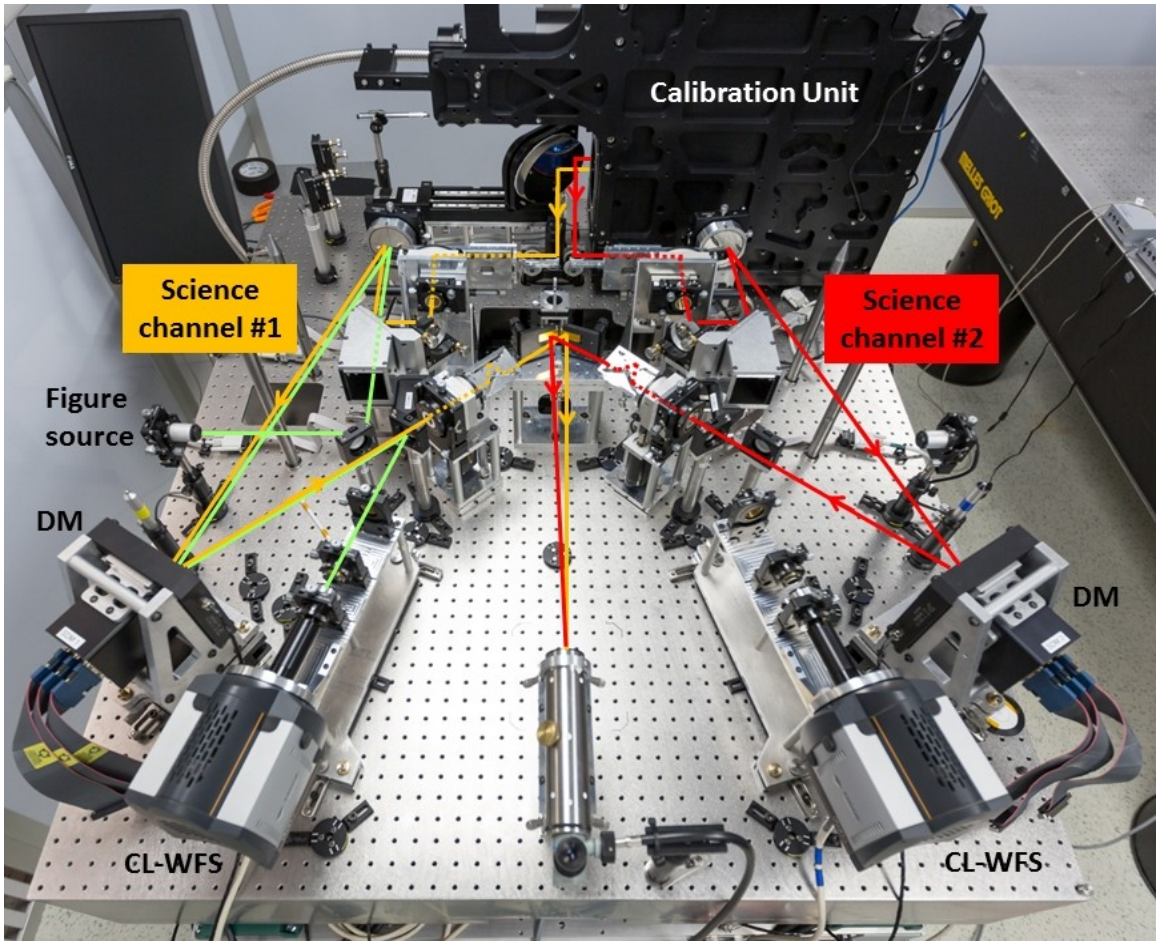
(3) Long-slit spectrograph



(4) Narrow/broad-band filter imaging

RAVEN

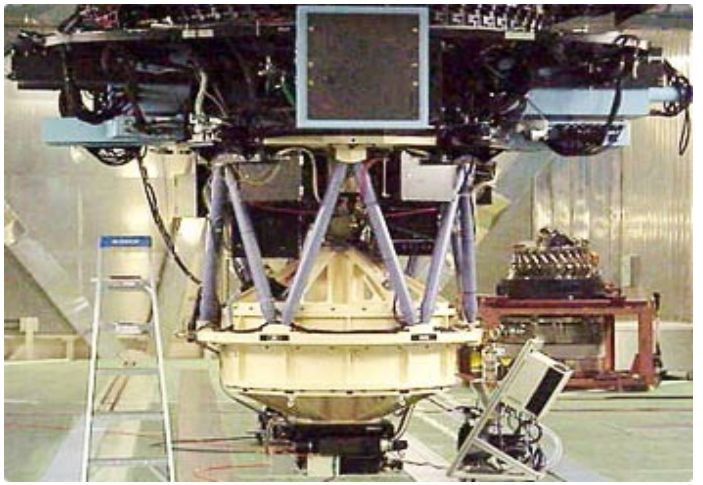
- Multi-Object AO PI-type visiting instrument

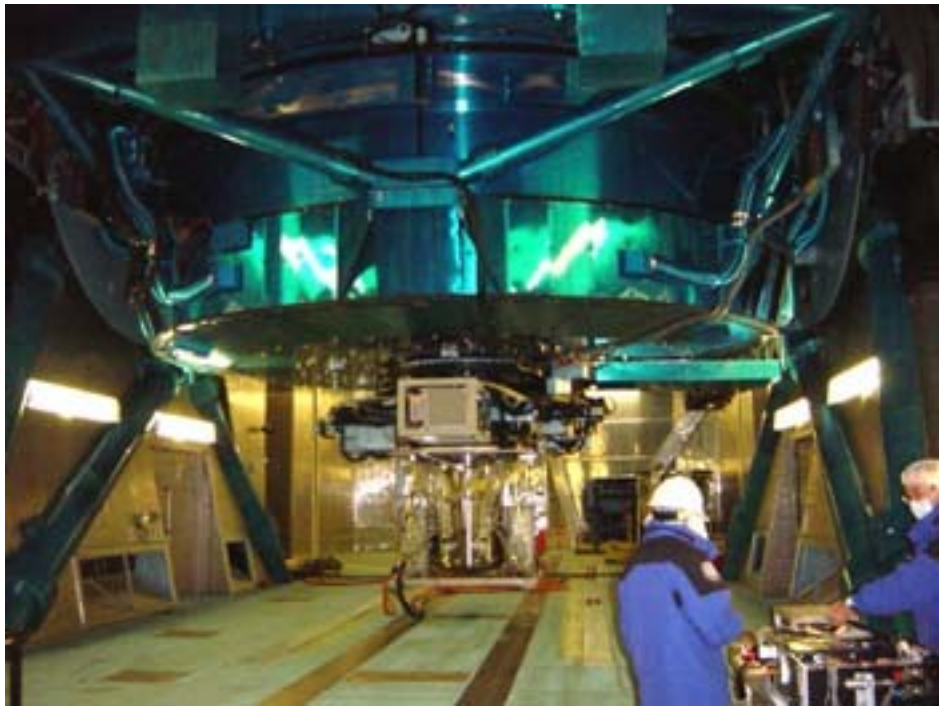


- To be used with IRCS

Cassegrain

FOCAS





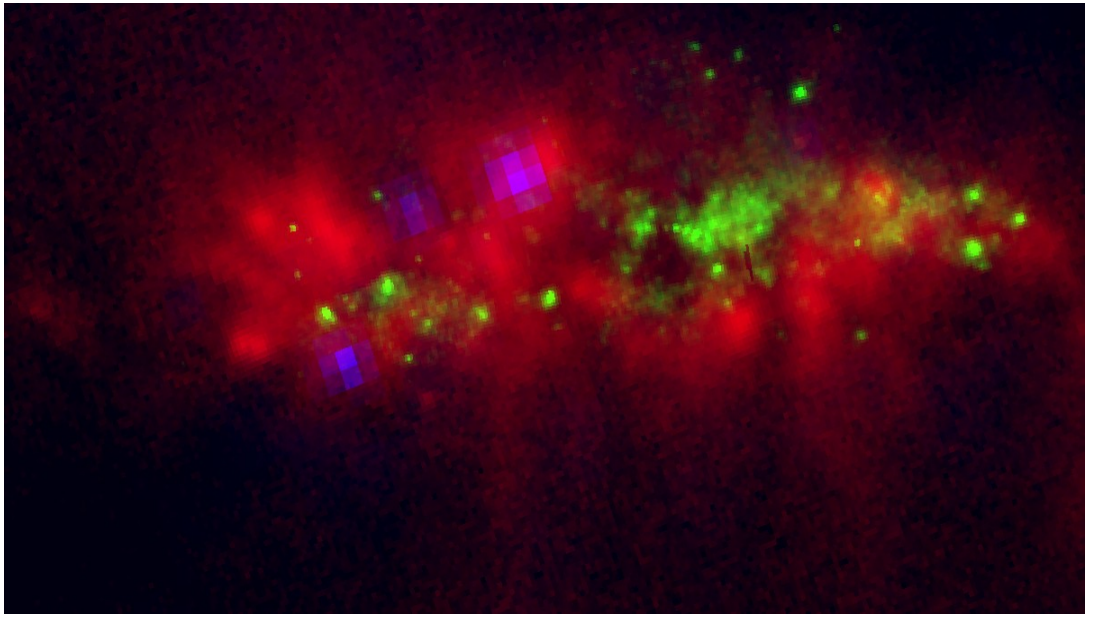
COMICS

CIAX

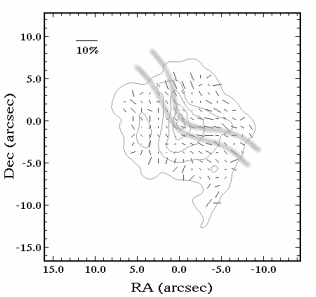
COMICS

- Cooled Mid-Infrared Camera and Spectrometer, first light 2000
- Imaging and spectroscopic capabilities from 7.5-25 μm
- Spectroscopy: Spectral resolution R = 250, 2500, or 8500

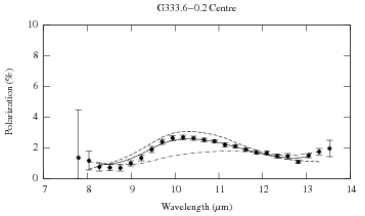
- Imaging: 42" x 32" FoV



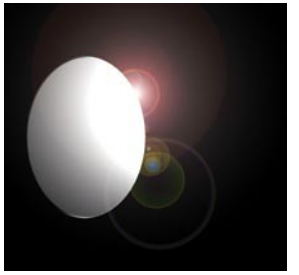
COMICS



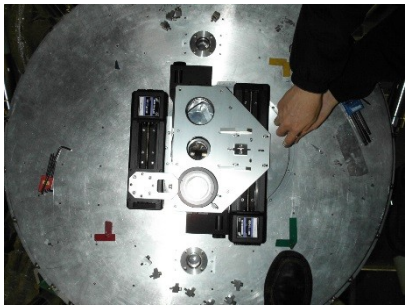
Coming soon: Imaging- and spectro-polarimetry in the *N*-band.



- Will be first mid-infrared polarimeter ever to be offered at Subaru.



Tentative schedule:

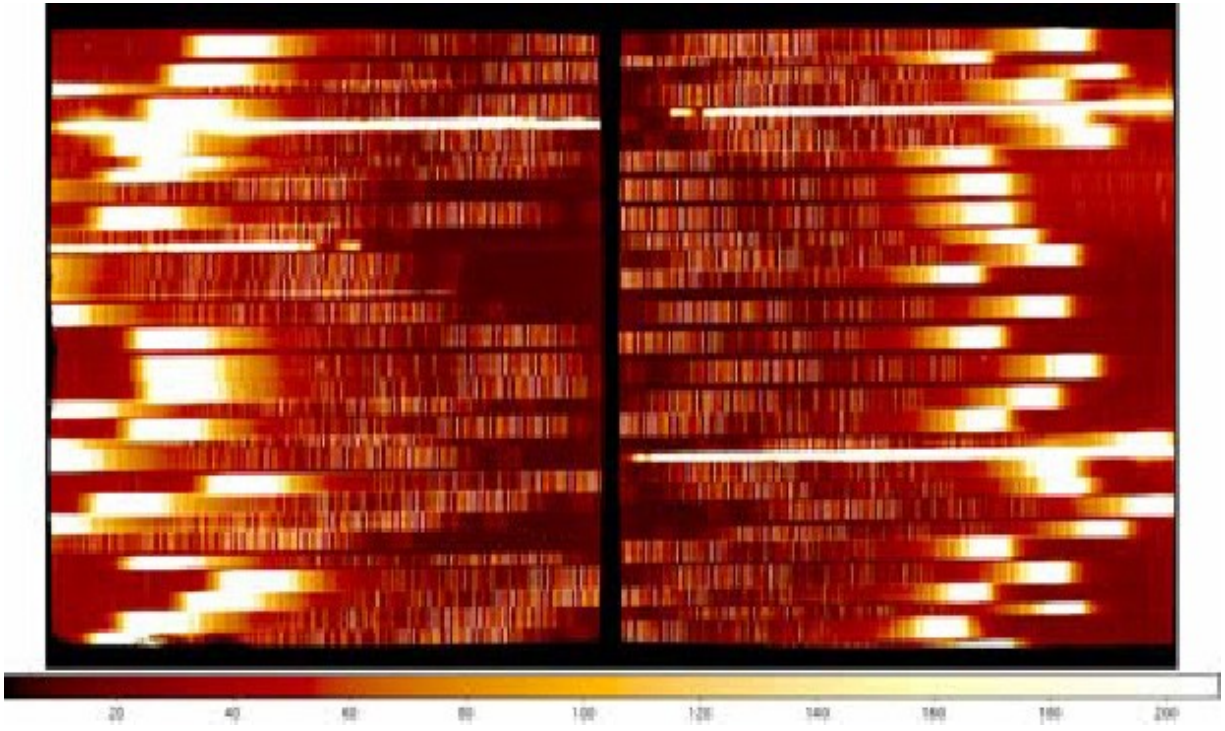


- Engineering observations later this year.

- Released to Open-Use next year.

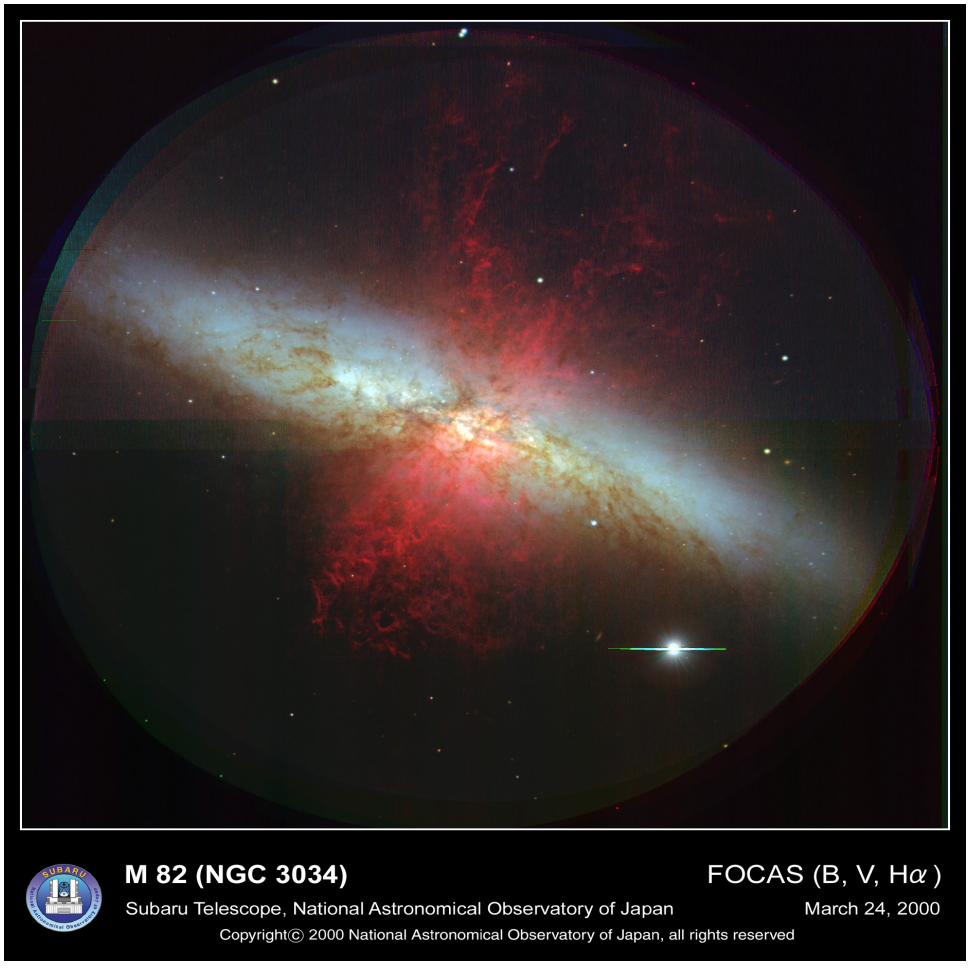
MOIRCS

- Multi-Object Infra-Red Camera and Spectrograph
- Near-IR (J, H, K) imaging over 4' x 7' rectangular FoV
- Spectroscopy: Spectral resolution R=640 to 1300 depending on grism and spectral region
- Capable of multi-object spectroscopy using slitmask



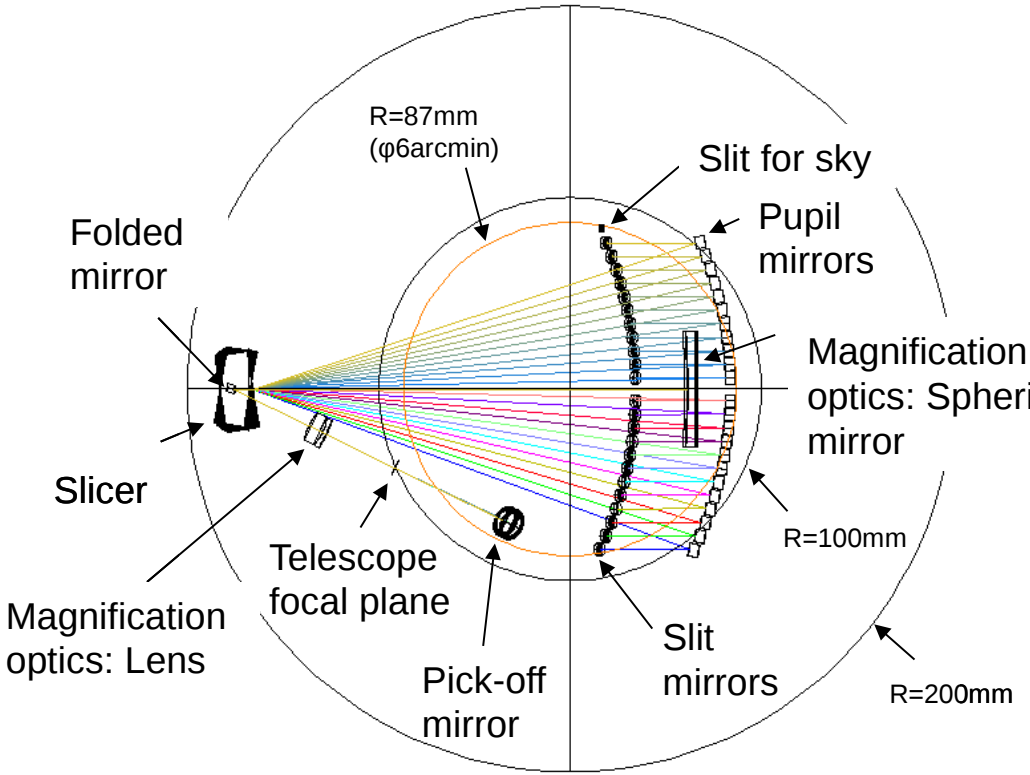
FOCAS

- Faint Object Camera and Spectrograph
- 6' FoV optical imager and spectrograph
- Imaging: More narrowband filters available than SPCam
- Spectroscopy: Numerous gratings/grisms available to choose resolution and spectral region; covers 3,700 to 10,000 Å; resolution R=250 to 7,500; M-O using slit mask
- Polarimetry.



FOCAS (2014)

- Integral Field Unit for FOCAS
  - project led by Dr. Ozaki (TMT-J)
  - optical design completed and fabrication in progress
  - will be tested in FY2014, no downtime expected.



type	image slicer
FoV	13".5 x 9".2
slit width	0".4

(use FOCAS MOS exchanger to switch to the IFU mode)

Nasmyth-Opt: HDS

- High Dispersion Spectrograph
- provides optical spectroscopy in the range 3,000 – 10,000Å
- Spectral resolution up to 160,000, highest of any optical spectrograph on an 8-10 m class telescope.
- Fibre unit to be added this year will provide M-O mode.