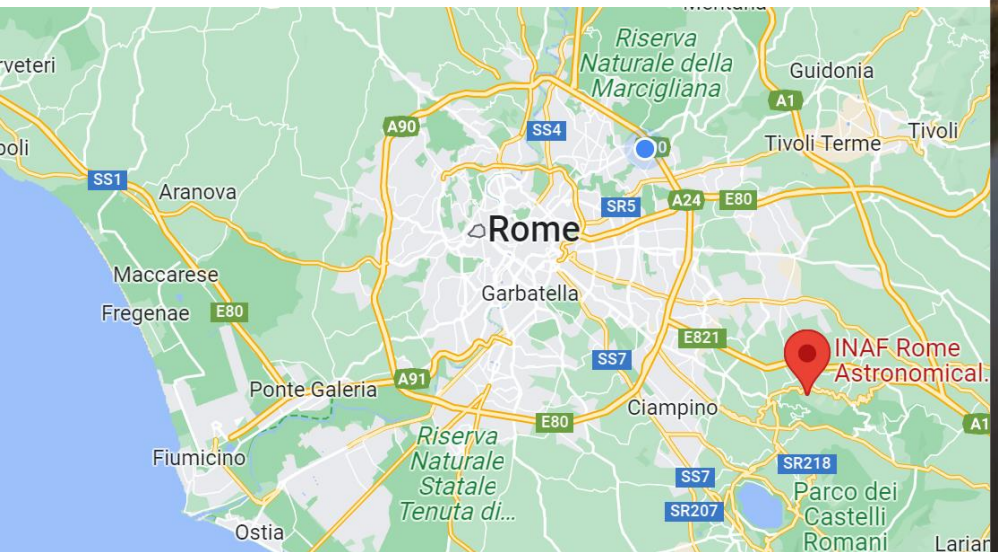
INAF – OAR: Laboratories

Via Frascati 33 – 00078 Monte Porzio Catone

Roberto Piazzesi on behalf of:
Centrone M., D'Alessio F., Ermolli I., Faccini M., Giorgi F., Li Causi G., Pedichini F., Terreri A., Viavattene G., Vitali F.

PRESENTATION LAYOUT:

1. Location of, and access to laboratories
2. Optics Lab
3. ADONI test bench
4. Laser Guide Star Lab
5. Synergies
6. PNRR future development (?)

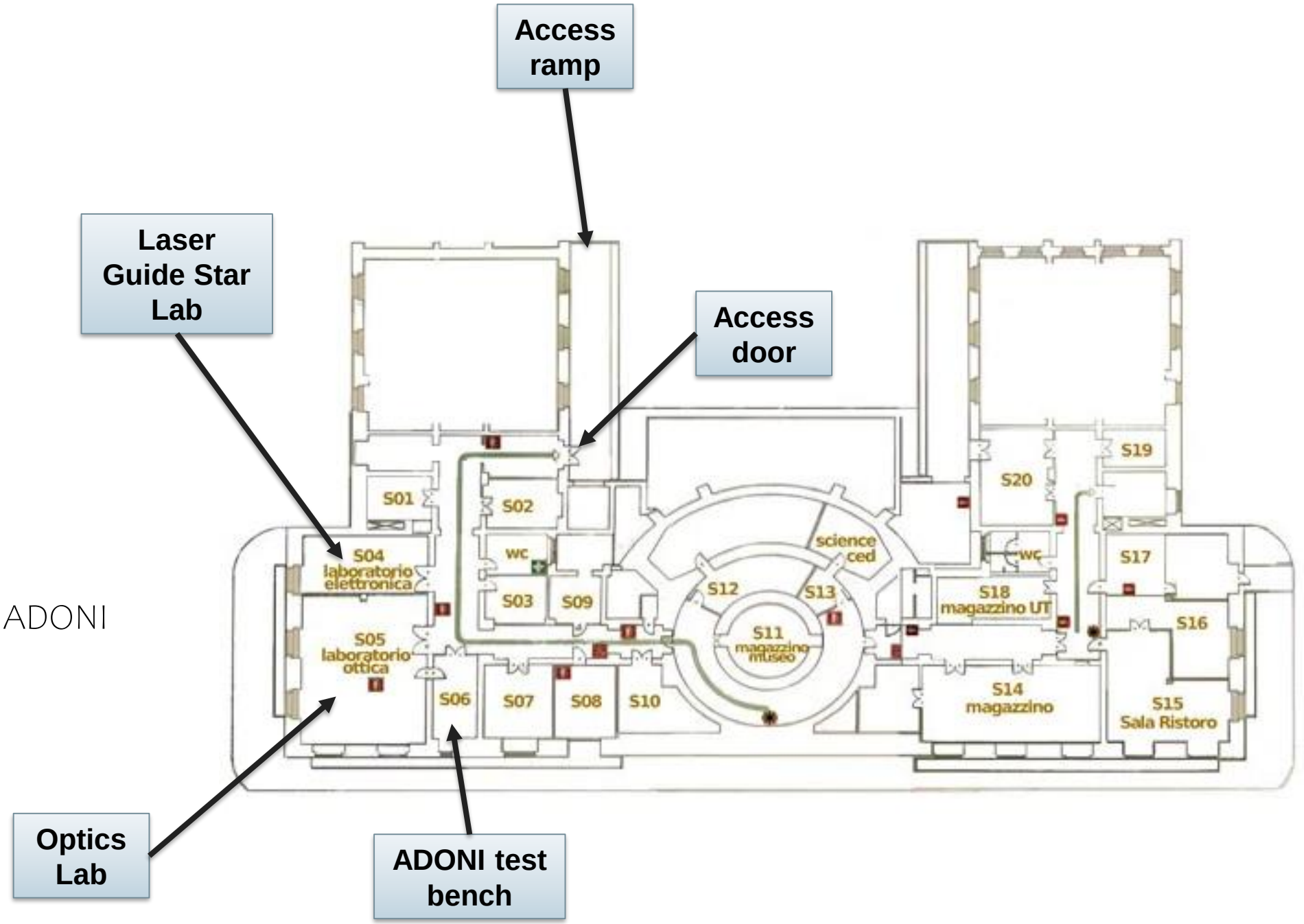


Location and access

Location: basement

Access:
- ramp (small and steep)
- access door 1.75 m

Equipment:
- Trans Pallet
- 2 manual cranes
- 1 manual bridge crane in ADONI lab (max 200 kg)



Laboratorio Ottica OAR

D'Alessio F., Giorgi F., Li Causi G., Pedichini F., Piazzesi R., Terreri A., Viavattene G., Vitali F.

FACILITY and DOTATION:

- 80 mq room with 2 optical bench of 3 x 1.5 and 2.4 x 1.2 m
- SH WF sensor 1kfps (15x15 or 33x33)
- Boston DM 144 actuator
- LED and LASER fiber sources (660 and 635) nm
- 2x sCMOS ANDOR camera (4Mpx, 1e- RON)
- 12mm pupil LCVR and wire grid polarizers
- Recirculating liquid chiller
- Lens kits and opto-mechanical supports
- Manual stages (linear and rotary)
- Motorized stages (linear and rotary)
- Basic tools for mechanics, vacuum and electronics
- Basic instrumentation for electronics
- Annexes: Test Bench ADONI

Expertise:

NIR control electronic procurement, test and commissioning
Optical detector selection and simulation
Design and integration of custom camera systems for visible light
Visible small instrument assembly and testing
Compact opto-mechanical design (Zemax and Solidworks)
Smart axes control system

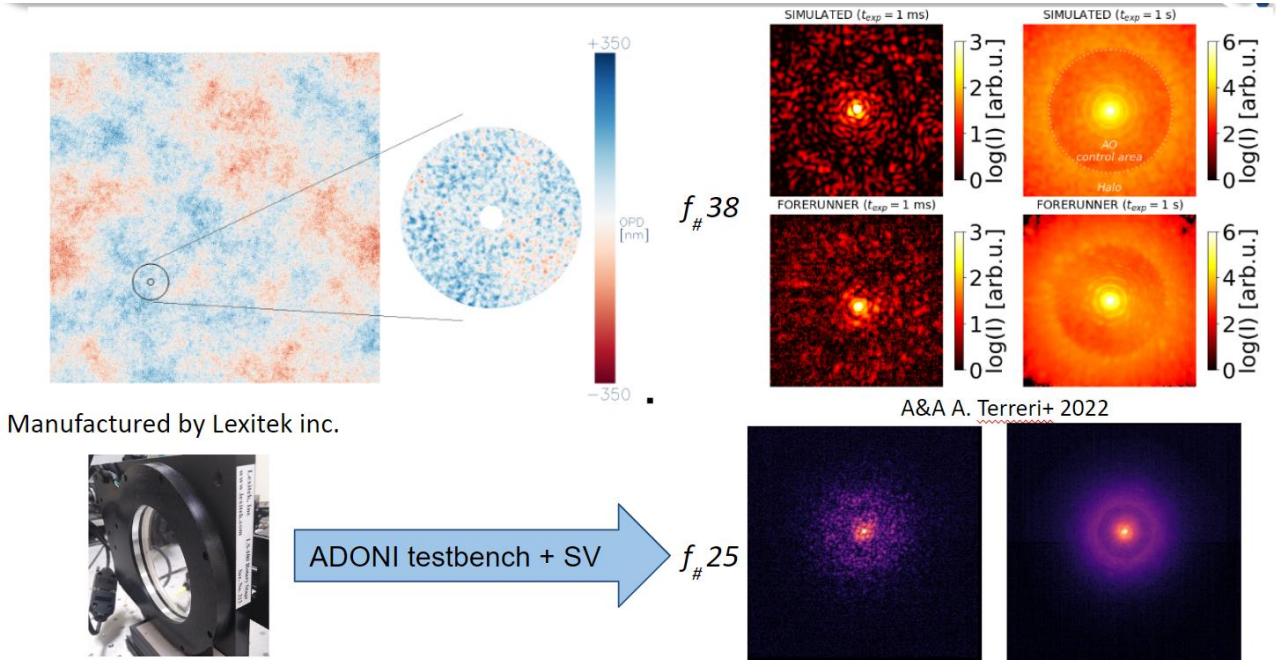
Current activities (overbooking!):

(finished Q2_2022)

SOXS: multiplexer control software and testing (ESO)
MOONS: 22x guide cameras (ESO)
SHARK-VIS: full making of a 2nd generation PI instrument for LBT
ELVIS: INAF funded TECHNO-PRIN exoplanet Hα spectroscope
IBIS 2.0: upgrade and test of the IBIS solar spectroscope for the VTT
MOSSCA: INAF funded study for modular scientific smart cameras
NONOISE: Hybrid photon counting detector on large field (ADONI)

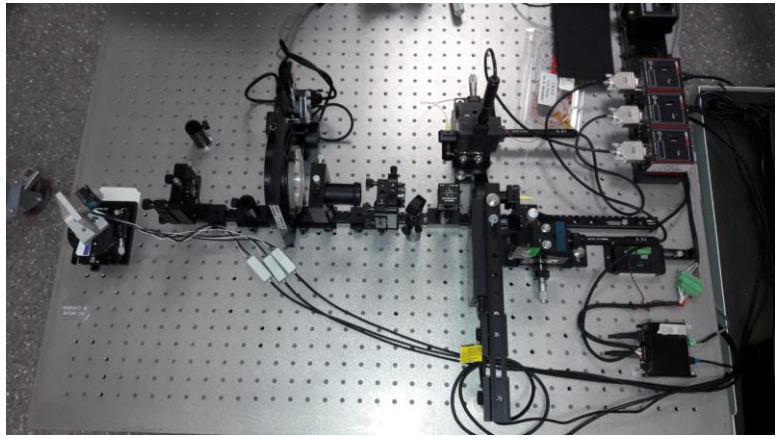
Test Bench ADONI
(Adaptive Optics National Institute)

Pedichini F., Li Causi G., Piazzesi R., Terreri A., Viavattene G.



FACILITY and DOTATION:

- 20 mq room with insulated optical bench of 1 x 2 m
- Diffraction limited f/15 telescope simulator
- High contrast couple of pointlike sources
- Close companion with sky rotation simulation
- Rotating phase screen for AO residuals
- Programmable 6LEDs fiber source
- LabView control



Expertise:

Reverse engineering of PSF from fits to machined phase screen
AO focal plane hardware simulation
Fast low noise detectors
Neural network PSF image analysis for WFS

Current activities:

SHARK-VIS: PAE final acceptance test

Next to come activities:

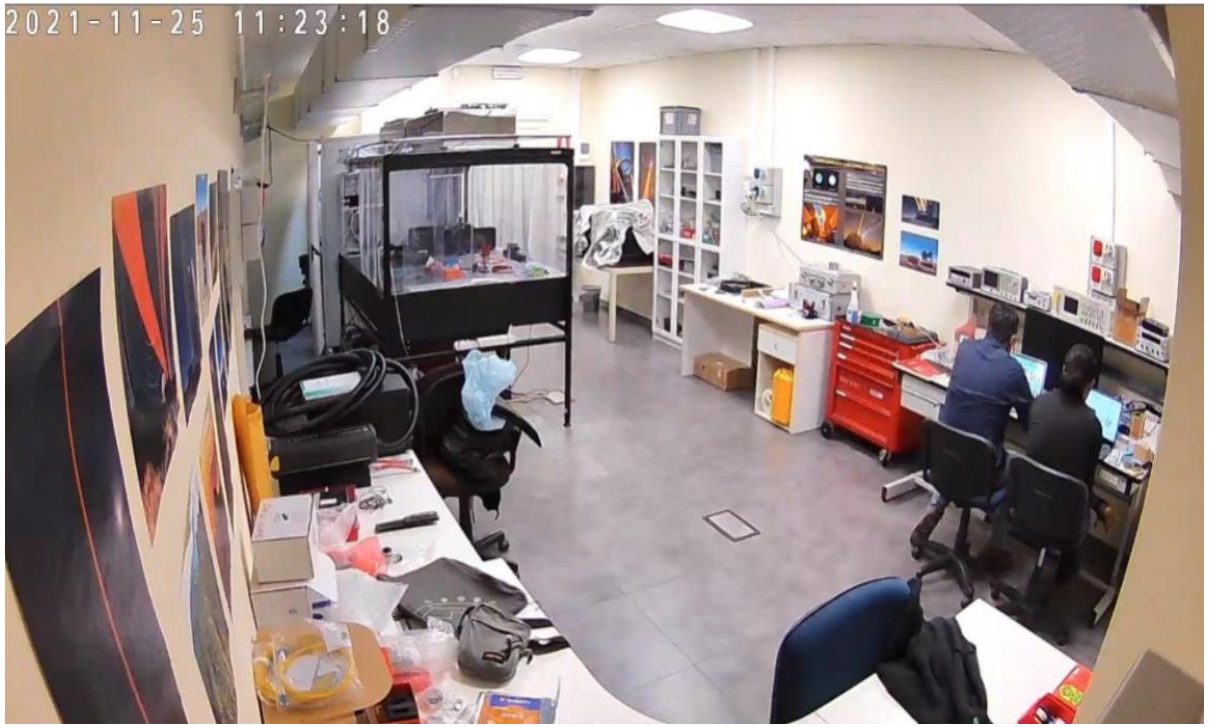
ELVIS: IFU throughput measurement with AO residuals
NONOISE: Hybrid (CMOS-MCI) detector characterization

Laboratorio Laser Guide Star for Adaptive Optics

Funded in 2020: Centrone M., Faccini M., Bonaccini D. (ESO)
Facilities, Dotation and Expertise ready to be shared for projects within INAF

FACILITY and DOTATION:

- 25 mq room with laminar flow optical bench of 2.4 x 1.4 m
- 2x OCAM EM-CCD (240x240 pix) 2kfps
- 2x FAST CMOS 1.6 Mpix 660 fps HB-1800-S
- ALPAO DM 97 with RTC (Cent OS 7.0)
- Na LASER 10W (tunable)
- SH 10x10 WF sensor
- PYRAMID WF sensor
- 2x LED fiber sources
- f/15 telescope simulator
- 10x $\lambda/2$ and $\lambda/4$ plates
- 2 recirculating liquid chillers
- Lens kits and opto-mechanical supports
- Motorized stages (linear and rotary)
- Basic electronic instrumentation



Expertise:
LabView control software development
Optical alignment
Complex AO system simulation
Test for AO and WFS systems

Current activities:
CANAPY in collaboration with ESO
ALASCA in collaboration with ESA

PNRR & future development (?)

ADONI test-bench facility will transform into:

DATA (Detector Advanced Test Assembly)

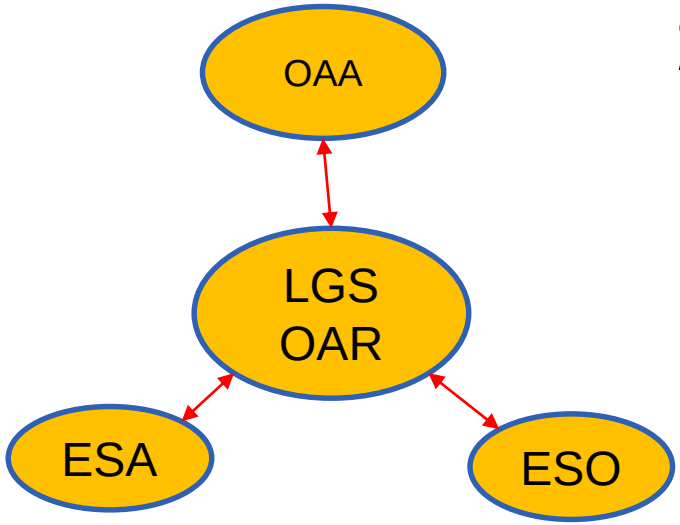
- Clean Room 15-20mq
- Seismic insulation
- Test-bench with variable f/#
- “Ad Hoc” seeing, turbulence and jitter generator
- Sky and sources, spectral projectors (300-1000)nm
- 6 dof detector mount
- Real time calibration with reference detector
- Full automation
- Hardware Sky and Telescope simulator

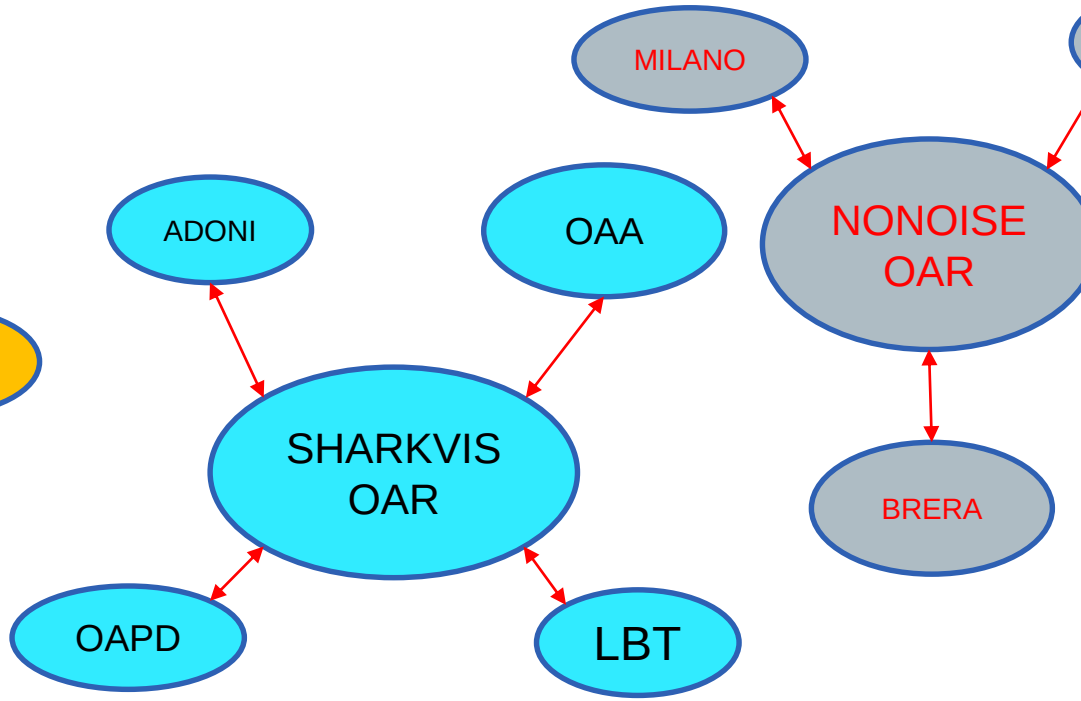
LGS LAB

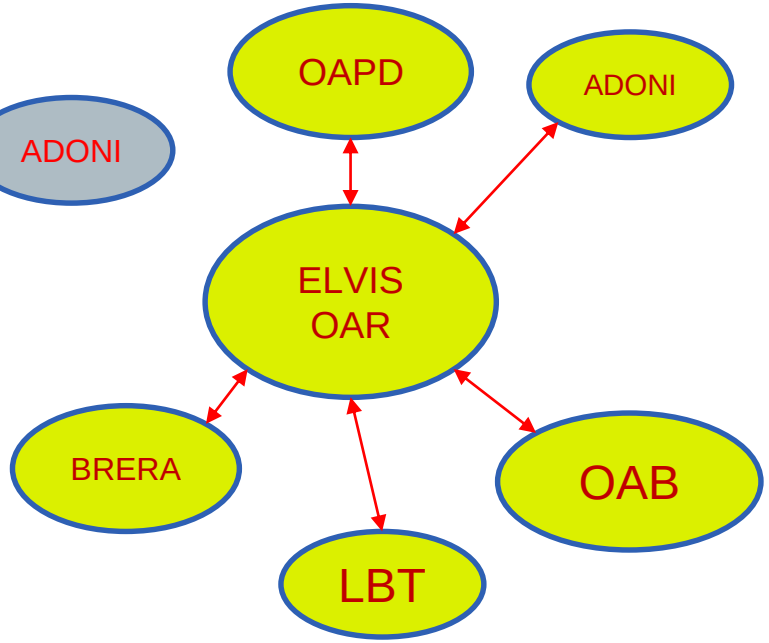
will add:

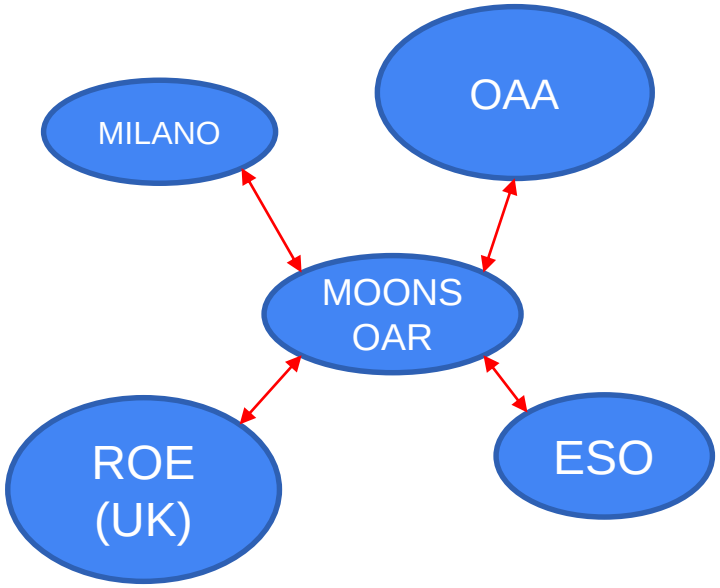
- Shack-Hartmann 12X12
- Axicon system
- Na LASER 589 nm 80W
- LPC (Laser Pointing Camera)

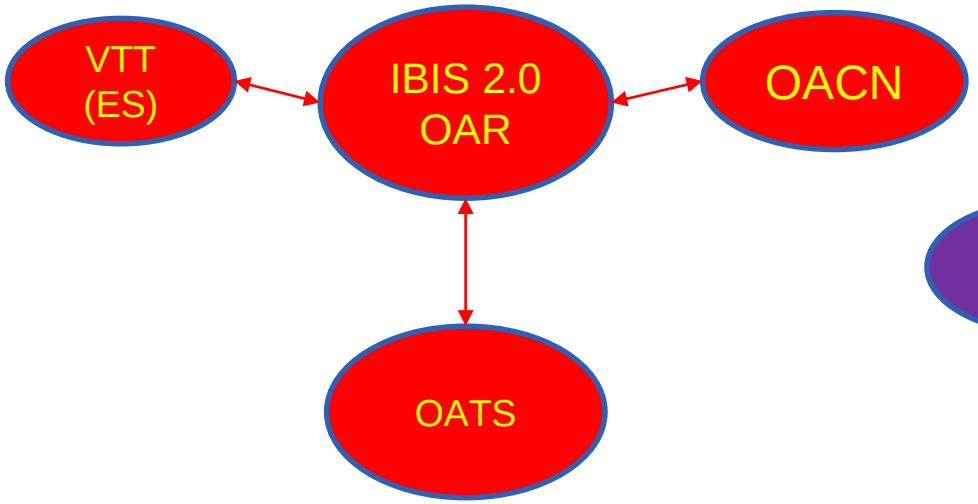
SYNERGIES at INAF-OAR

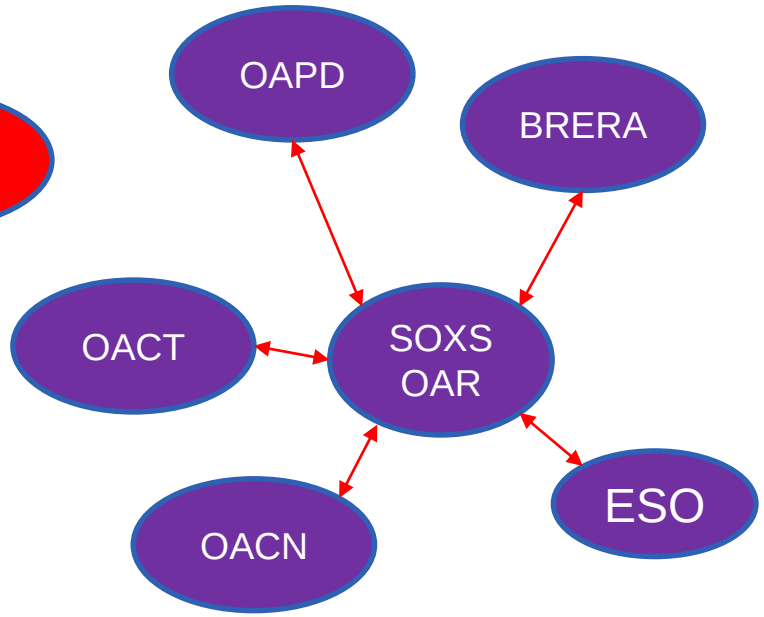


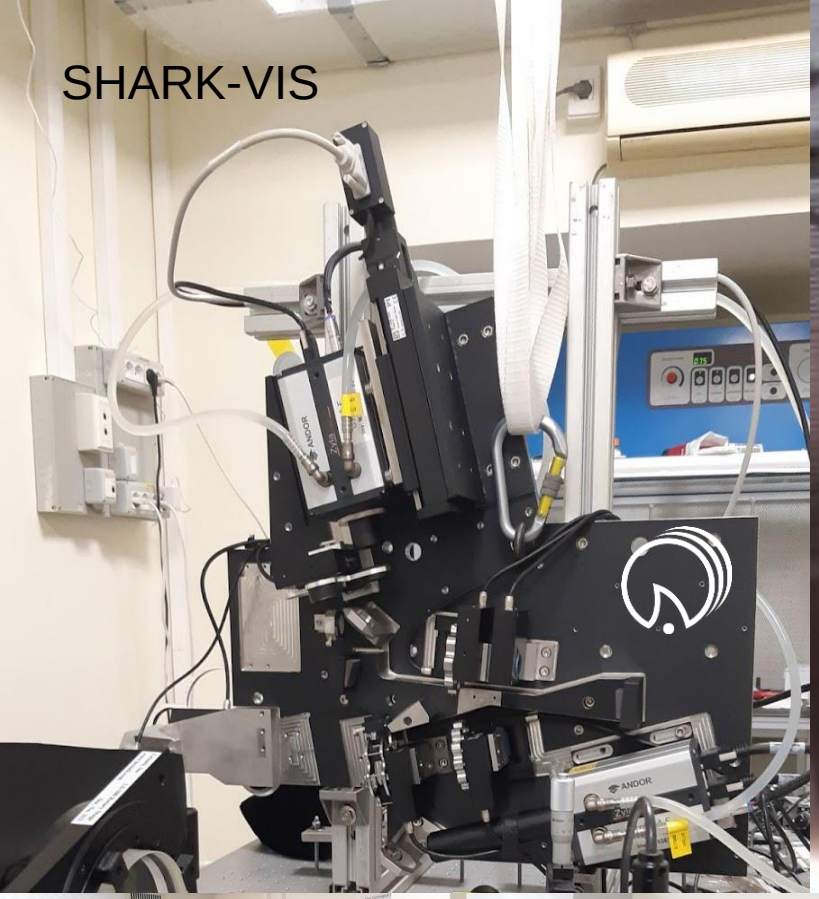










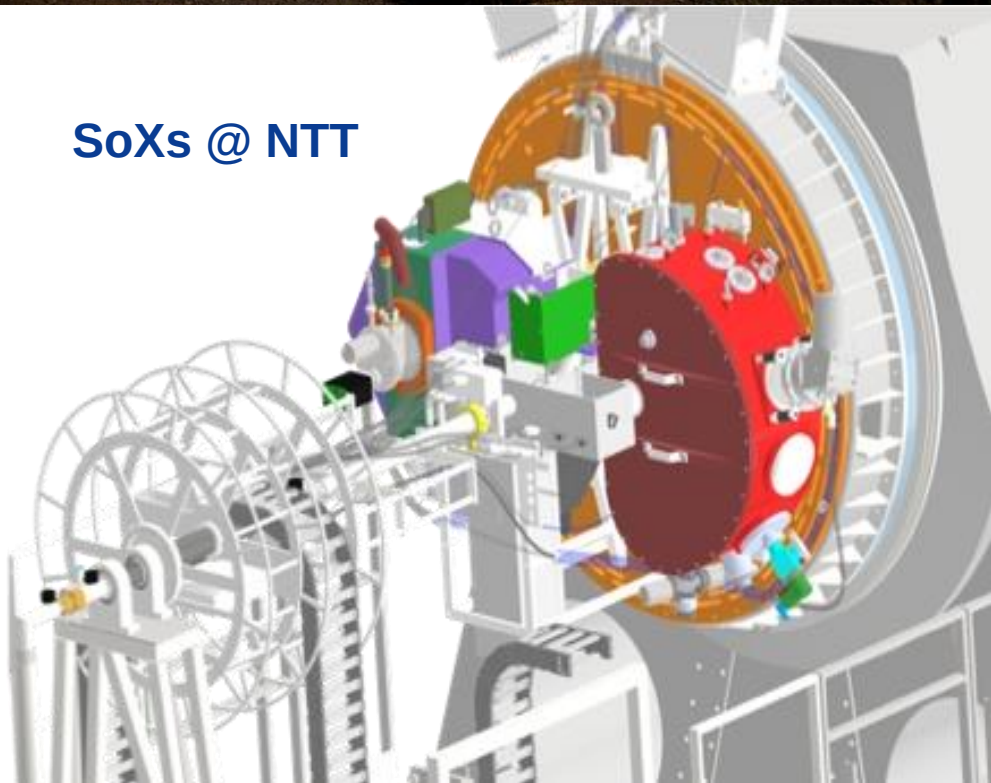

SHARK-VIS


LBCs at LBT


LASER
GUIDE
STAR


IBIS 2.0


MOONS
Guide Camera


SoXs @ NTT