



The Robotic telescope APT2 & the SOXS Spectrograph

Ricardo Zanmar Sanchez

Giuseppe Leto

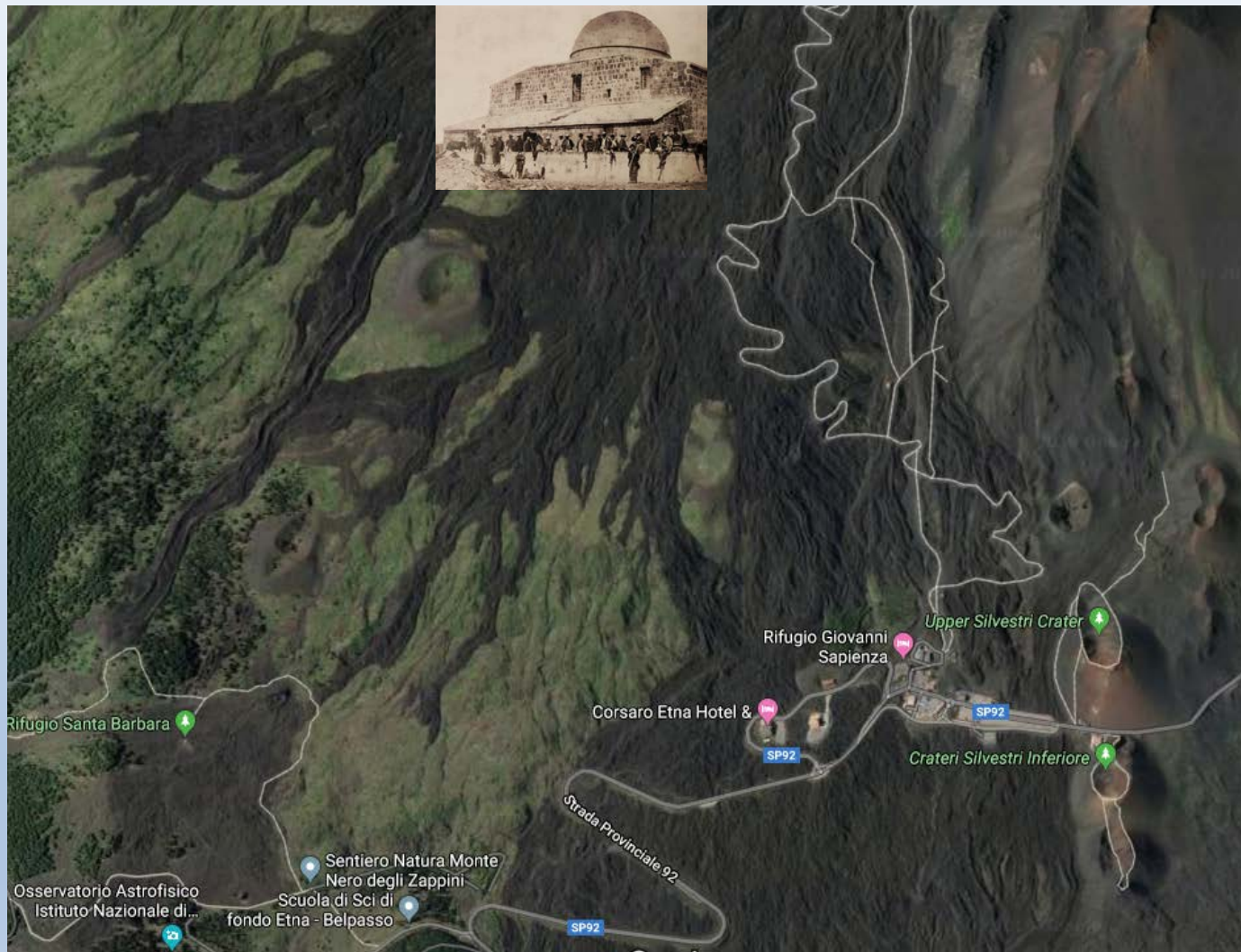
INAF Istituto Nazionale di Astrofisica
Osservatorio Astrofisico di **Catania**

10th Gaia Science Alerts Workshop

Catania, 18-20 December 2019



M.G. Fracastoro Station





M.G. Fracastoro Station

Serra La Nave (Mt. Etna)

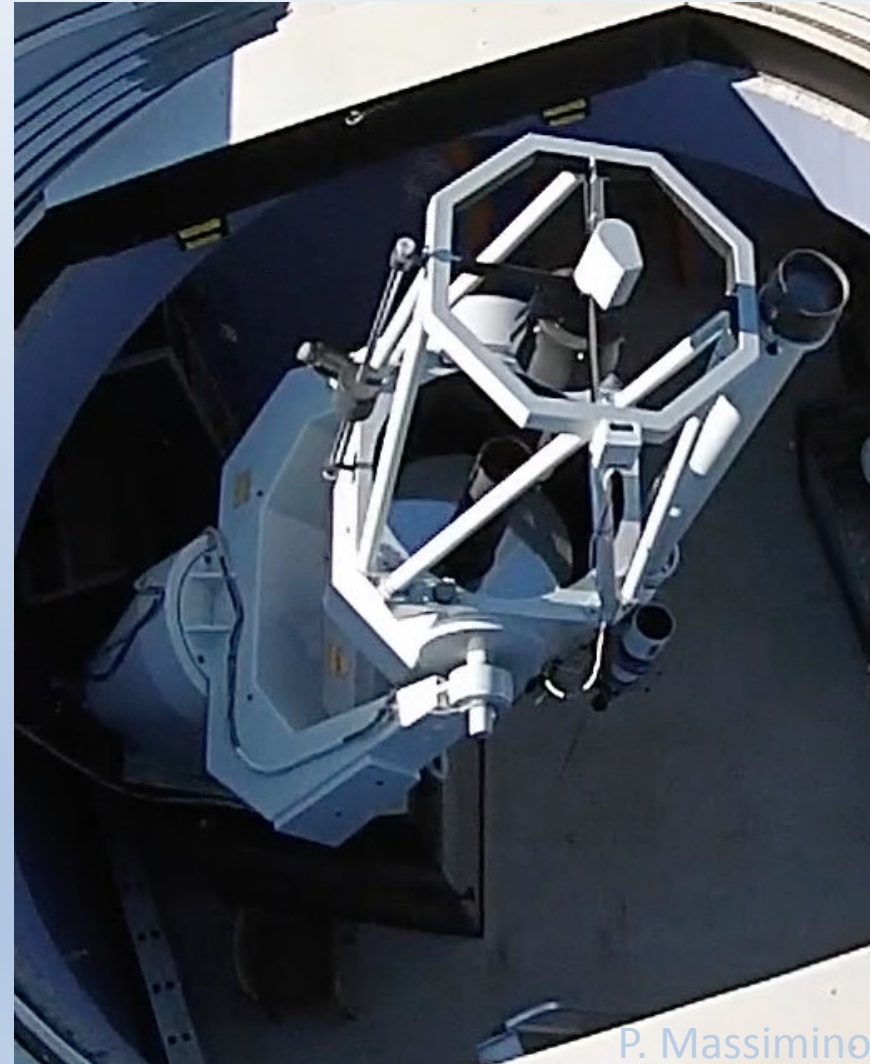
+14.973° E, +37.692° N, 1725m a.s.l.





The APT2 Telescope

- **Ritchey-Chrétien, 80cm, f/8**
- **Fully automated**
 - Checks of local meteo, dome, rain sensor, calibration images (twilight flats), autoguide.
- **Focal plane:**
 - Apogee CCD camera (CG240), with a 2K x 2K detector
 - linear scale: $0.47 \text{ arcsec pixel}^{-1}$
- **FoV: 16 arcmin.**
- **Filters: UBVRI & neutral**
- **Pipeline**
- **Operation modes: automatic, remote, local**



P. Massimino



The APT2 Telescope

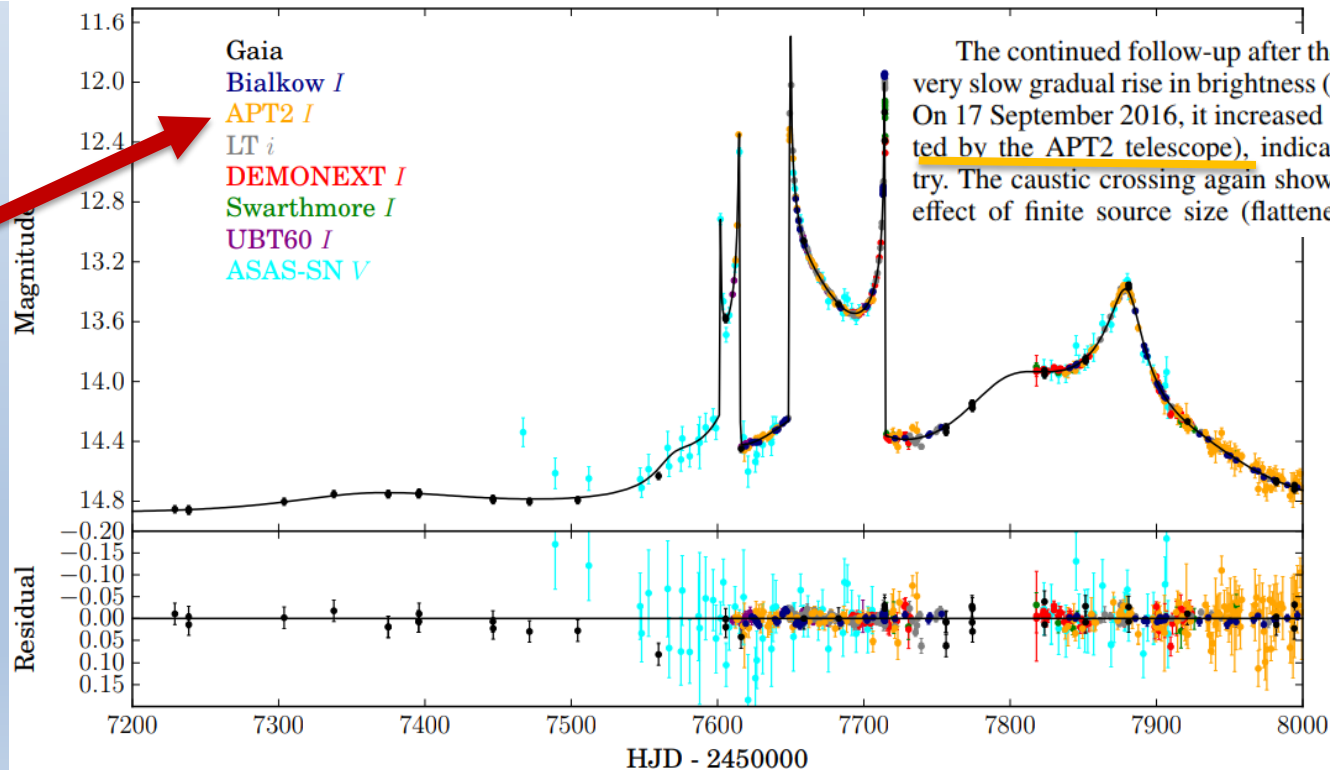
Astronomy & Astrophysics manuscript no. pap16aye
October 30, 2019

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Full orbital solution for the binary system in the northern Galactic disc microlensing event Gaia16aye★

Łukasz Wyrzykowski^{1,★★}, P. Mróz¹, K. A. Rybicki¹, M. Gromadzki¹, Z. Kołaczowski^{45,79,★★★}, M. Zieliński¹, P.





APT2 dome is broken





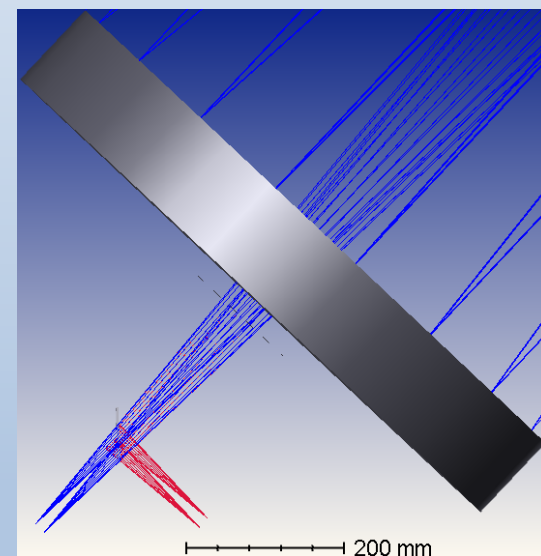
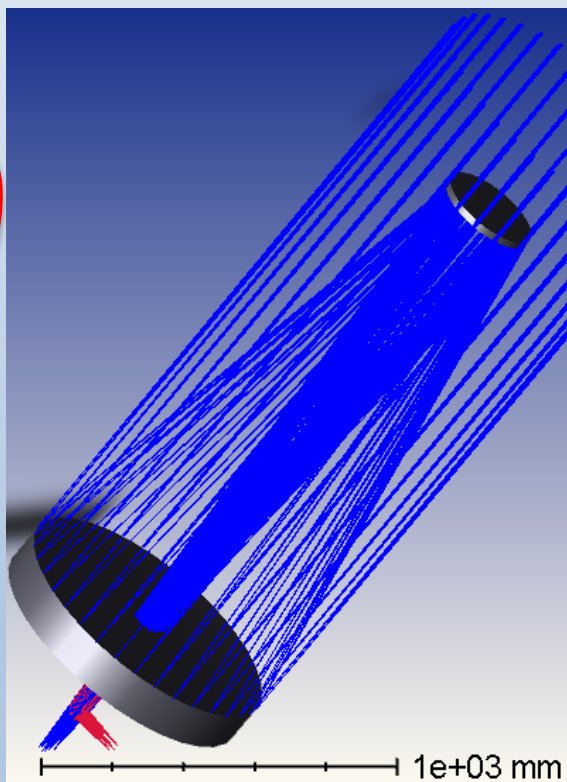
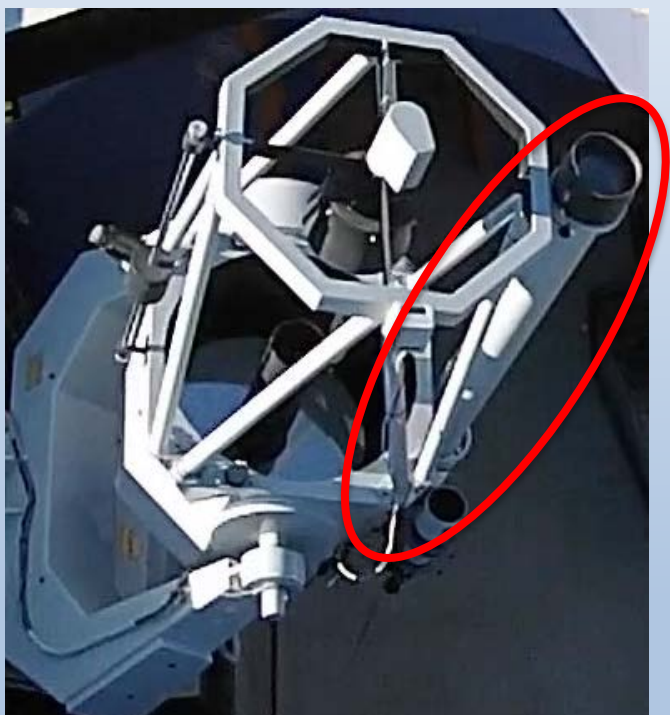
APT2 upgrade

- Dome was repaired and upgraded
- Re-coated primary and secondary mirrors
- New photometric filters
- New cover for primary mirror



APT2 upgrade

Autoguiding system





APT2

Schedule

- Re-mount during January-February, 2020
- New filters/filter wheel by April 2020
- New autoguide, during late 2020





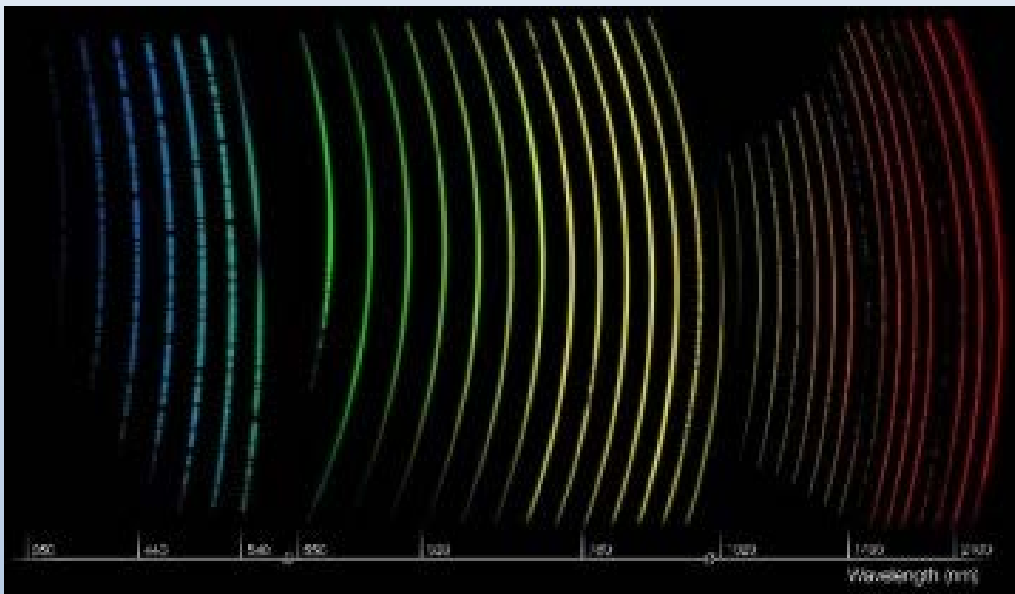
SOXS

Ricardo Zanmar Sanchez
Matteo Munari

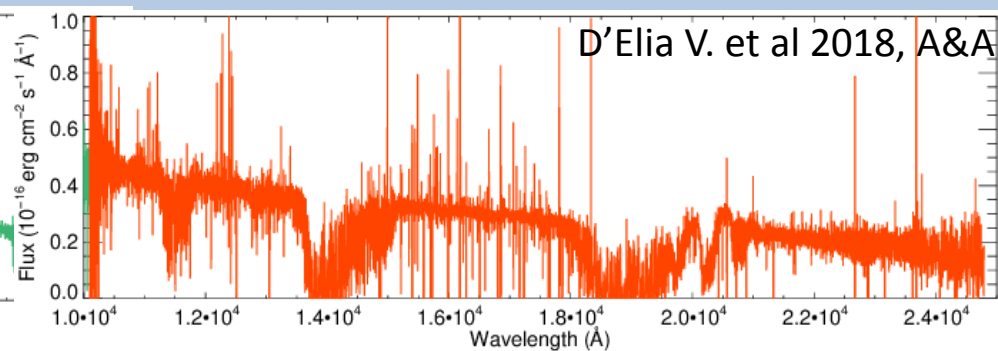
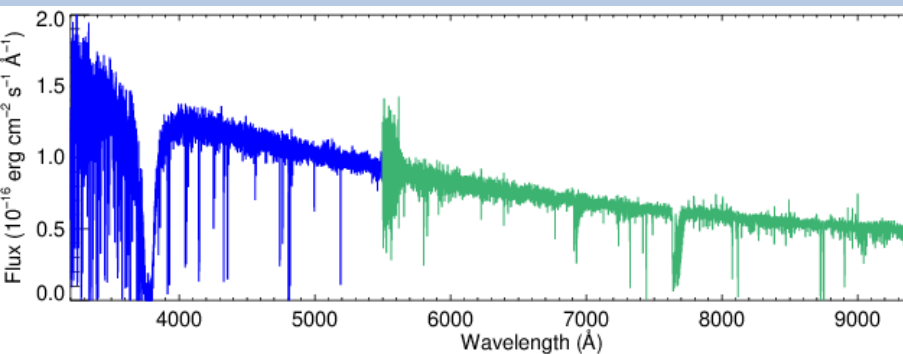


SOXS

SO_n of XShooter



Lopez S. et al 2016, A&A



D'Elia V. et al 2018, A&A



SOXS



Consortium

Institutes from 6 Countries

- ❑ Istituto Nazionale di AstroFisica (INAF), **Italy**
- ❑ Department of Particle Physics and Astrophysics, Weizmann Institute of Science, Rehovot, **Israel**
- ❑ Universidad Andres Bello & Instituto Milenio de Astrofisica (MAS), Santiago, **Chile**
- ❑ FINCA - Finnish Centre for Astronomy with ESO & Turku University, Turku, **Finland**
- ❑ Queen's University Belfast, **UK**
- ❑ Tel Aviv University, Israel
- ❑ Niels Bohr & Aarhus University, Copenhagen, **Denmark**



P.Schipani



SOXS

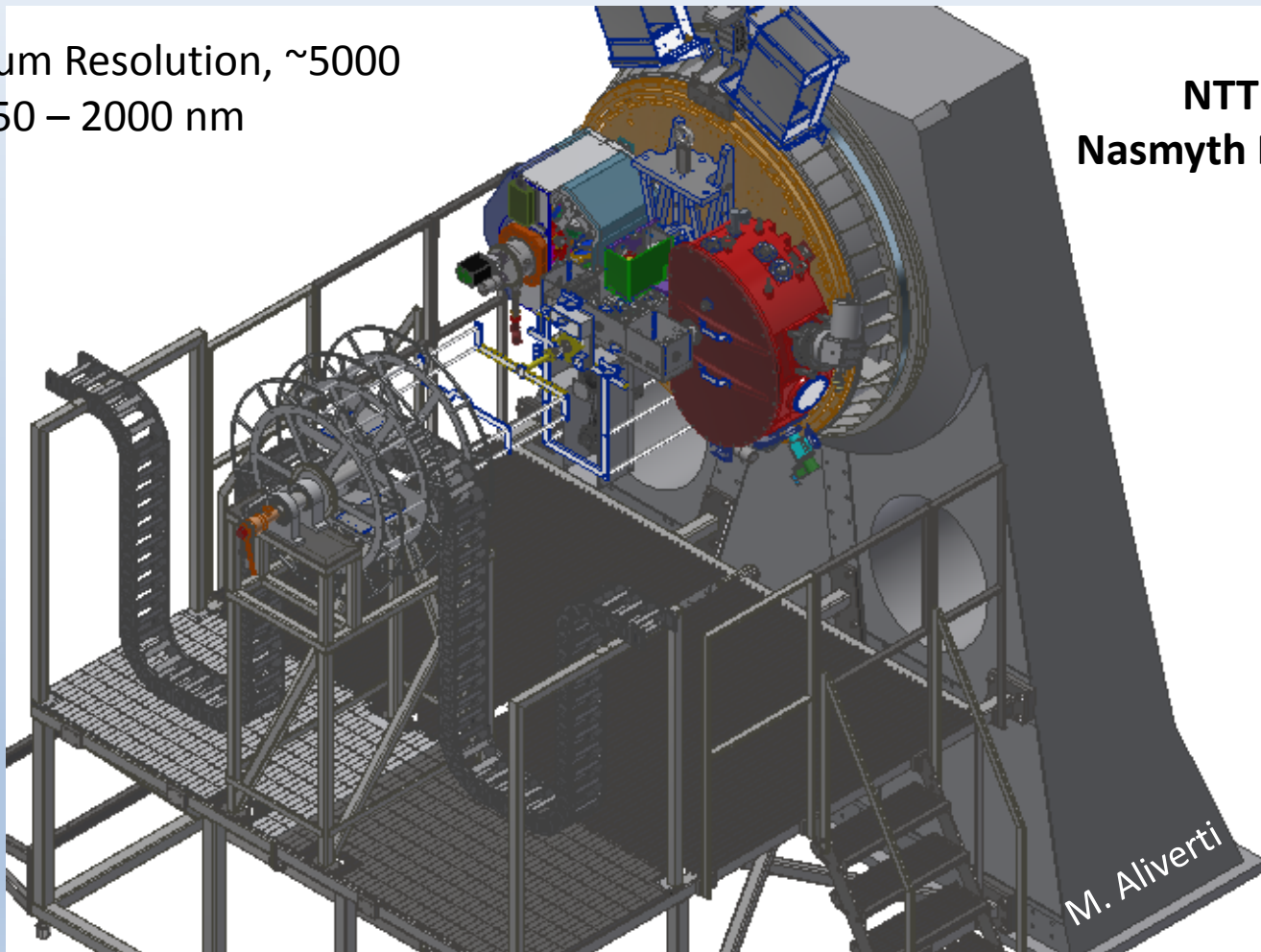
- Dedicated to early follow up of transient objects
- Quick response time
- Schedule day-by-day
- 50% time consortium (5yr), 50% ESO community
- All data public after 12 months



SOXS

Medium Resolution, ~ 5000
WL 350 – 2000 nm

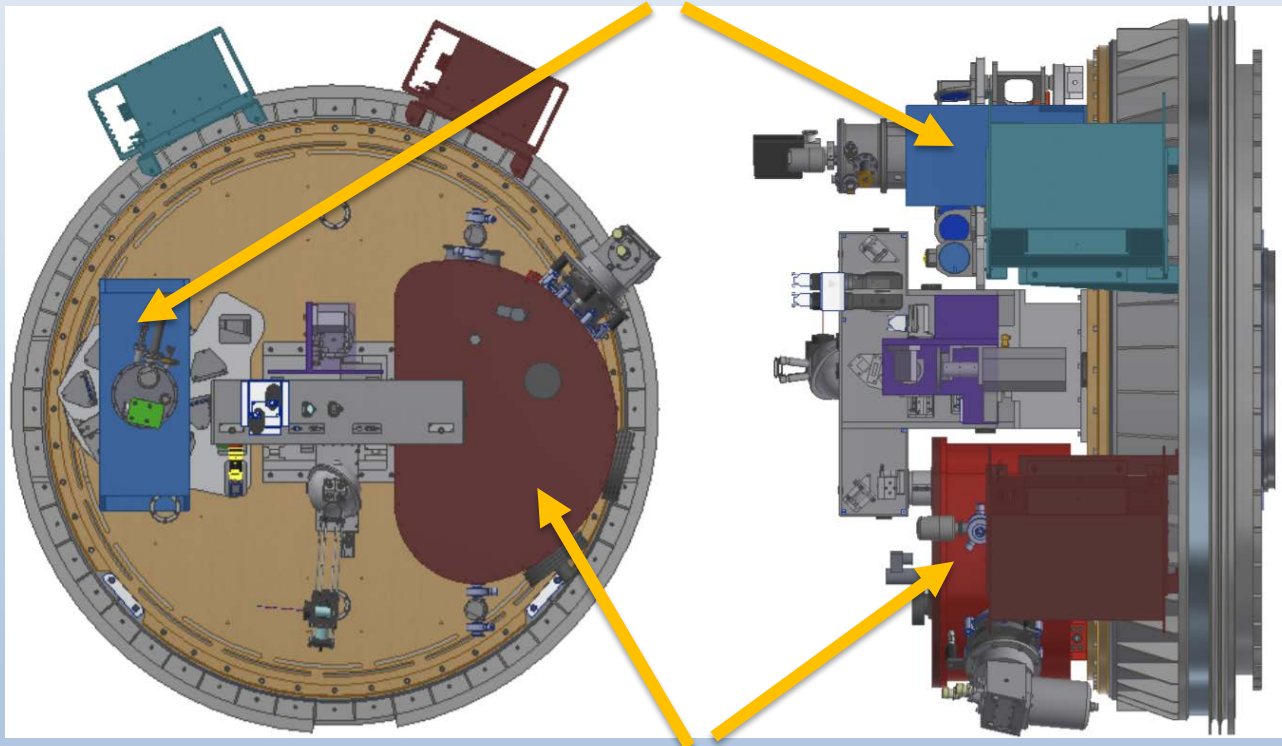
NTT
Nasmyth Focus





SOXS

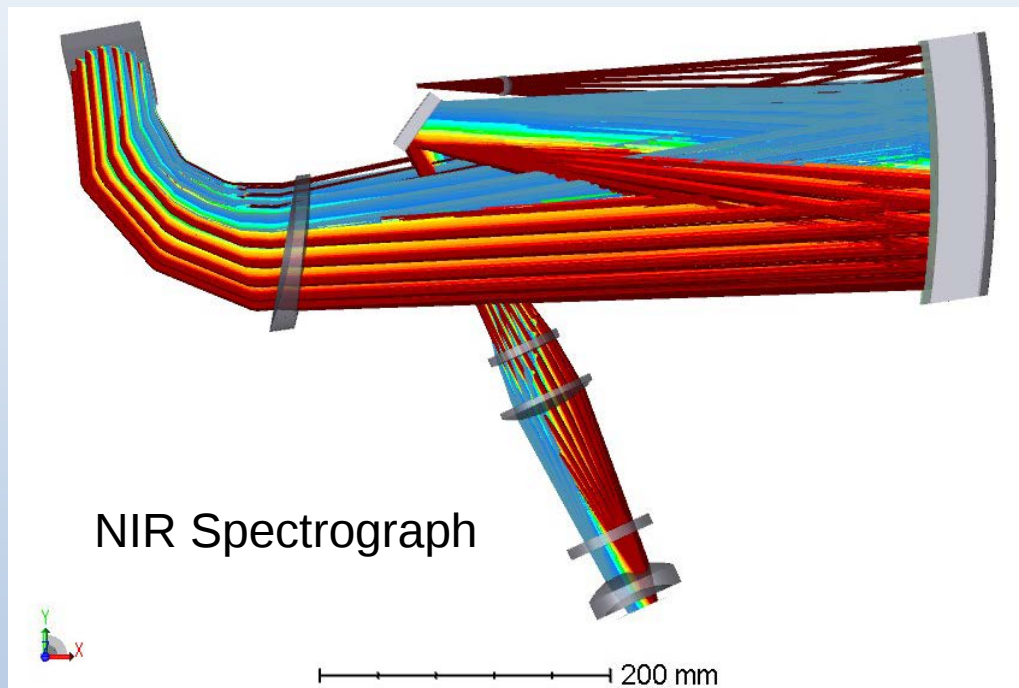
UV-VIS Spectrograph



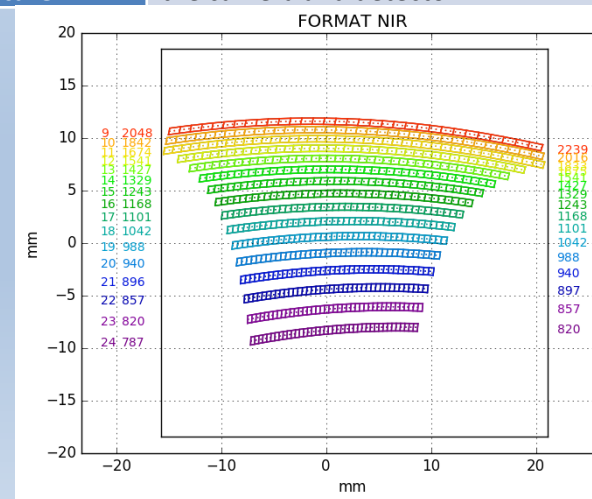
NIR Spectrograph



SOXS

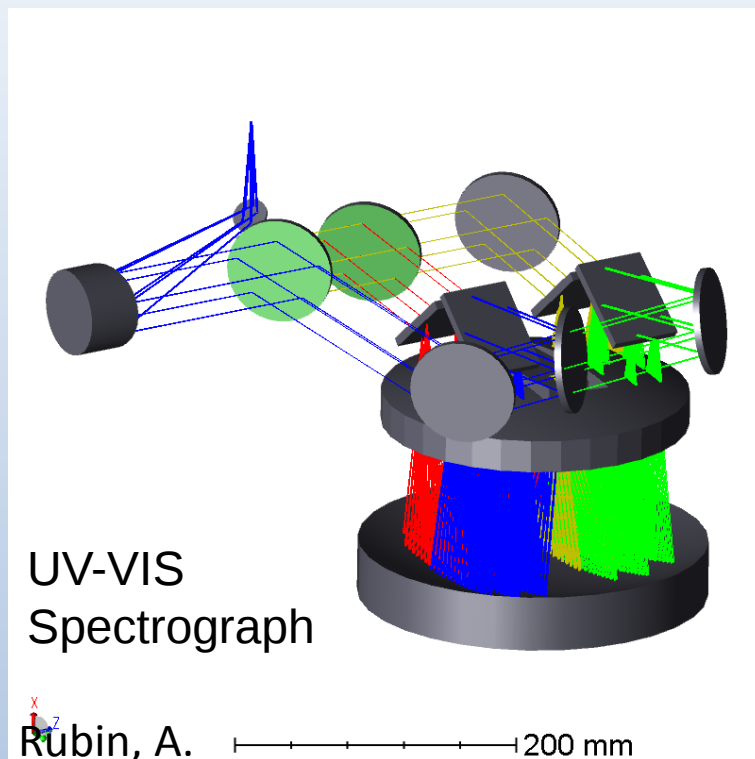


Collimator Ratio	Focal	6.5
Collimator diameter	Beam	50mm
Spectral range		800-2000 nm
Resolution (1 arcsec slit)		5000
Foreseen slits		0.5 - 1.0 - 1.5 - 5 arcsec
Slit height		12 arcsec
Camera Output Focal Ratio		~3.7
Detector		2K x2K , 18 μ m side pixel
Detector Scale		0.25 arcsec/pixel
Main Disperser		Grating 44° blaze angle, 4° off-plane
Cross Disperser		3 Cleartran Prisms of apex angle 20°, 20°, 26°
Total Volume (optical surfaces)		~700 x450 x200 mm
Working temperature		150K. 40K for the last two elements of the camera and detector

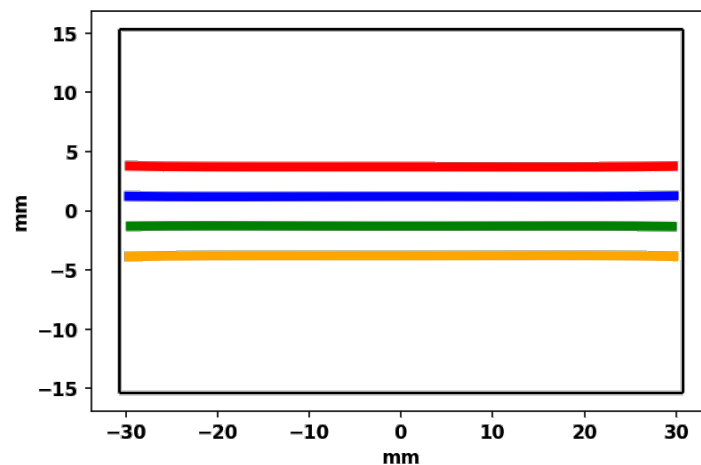




SOXS



Collimator Ratio	Focal	6.5
Collimator diameter	Beam	45mm
Spectral range		350-850 nm
Resolution (1 arcsec slit)		4500
Foreseen slits		0.5 - 1.0 - 1.5 - 5 arcsec
Slit height		12 arcsec
Camera Output Focal Ratio		~3.1
Detector		e2V CCD44-82
Detector Scale		0.3 arcsec/pixel
Main Disperser		Four custom ion etched gratings
Cross Disperser		3 Cleartran Prisms of apex angle 20°, 20°, 26°
Working temperature		Ambient temperature





SOXS

Project Schedule

Project Phase	Start	End
Preliminary Design	08/2016	07/2017
Final Design	08/2017	10/2018
MAIT	11/2018	2020
Inst. & Commissioning (Chile)	2020	2021
Operations	2021	≥ 2026

i.e. call for proposals to the community in 2022



SOXS

END