Fundación Galileo Galilei - INAF
Telescopio Nazionale Galileo

28°45'14.4"N 17°53'20.6"W 2387.2m A.S.L.

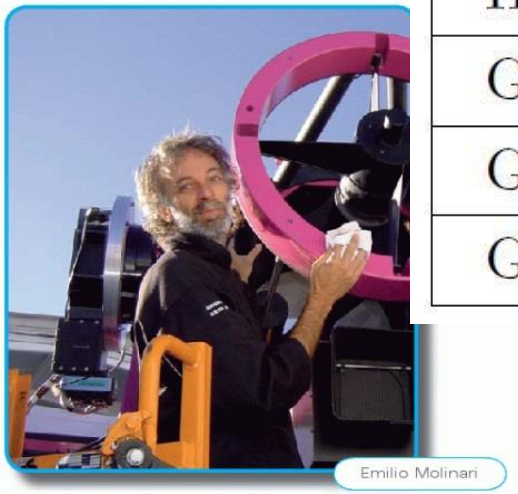
Science with low and high-resolution spectrographs at Telescopio Nazionale Galileo

Ennio Poretti

La Palma (Canary Islands, Spain)

Area: 2 kmq

Altitude: 2.396 m



Instrument	Date
TNG	June, 9^{th} 1998
OIG	Dec, 10^{th} 1998
ARNICA	Dec, 18^{th} 1998
AdOpt	Dec, 18^{th} 1998
DOLORES	May, 20^{th} 2000
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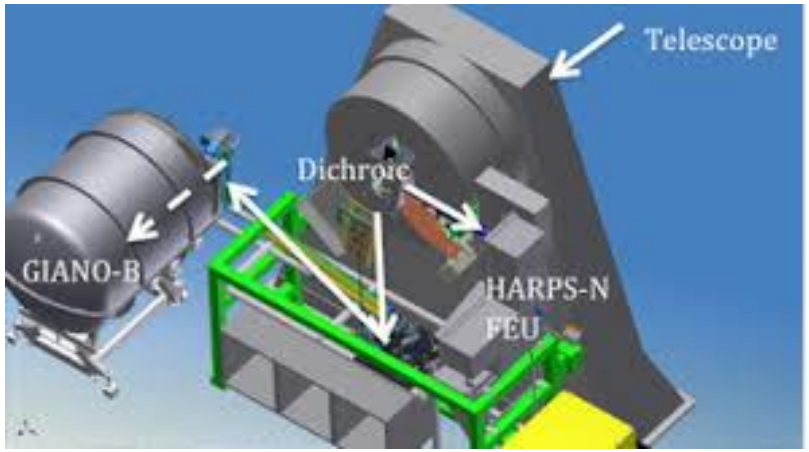
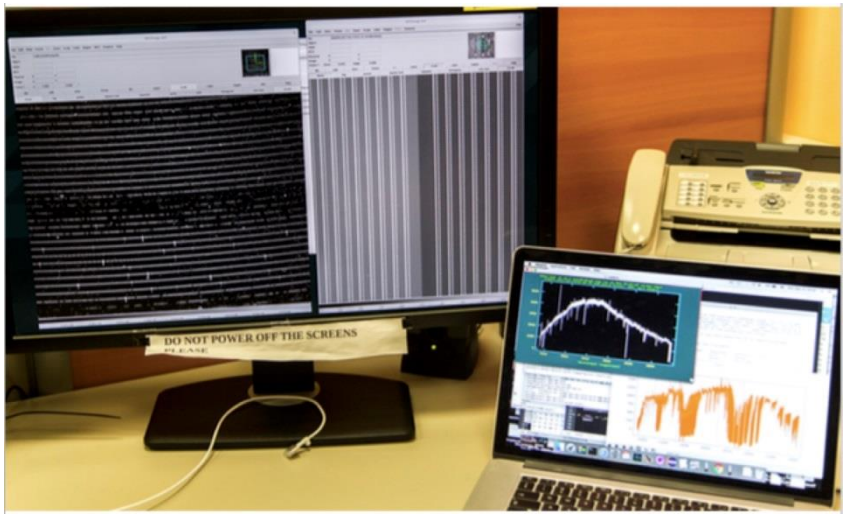
NICS	September, 17^{th} 2000
HARPS-N	March, 21^{st} 2012
GIANO	July, 27^{th} 2012
GIANO-B	Oct, 27^{th} 2016
GIARPS	March, 14^{th} 2017

Four instruments , all fully operational

- **HARPS-N**, high-resolution spectrograph (R=115000) operating in the visible. Agreement with the HARPS-N Consortium renewed for 5 years (2017-2022)
- **GIANO-B**, high-resolution spectrograph (R=50000) operating in the near infrared
- **DOLORES**, low-resolution spectrograph (R<6000) and imaging
- **NICS**, near-infrared instrument allowing low-resolution spectroscopy (R<2500), imaging, imaging polarimetry, spectropolarimetry

GIANO-B and HARPS-N now combined in the **GIARPS** observing mode.
Simultaneous visible and infrared spectra of the same target.





The Sun as a star

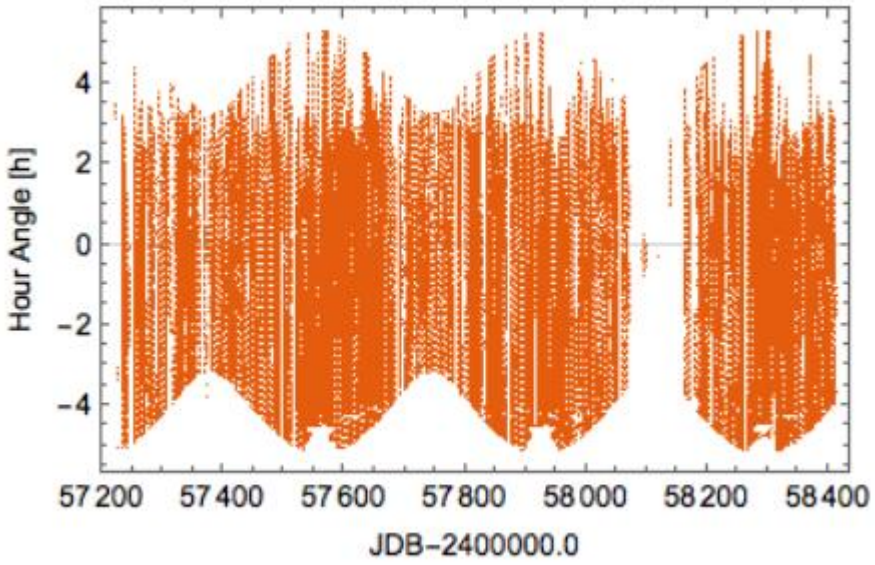
David Phillips, Xavier Dumusque, TNG staff, et al.

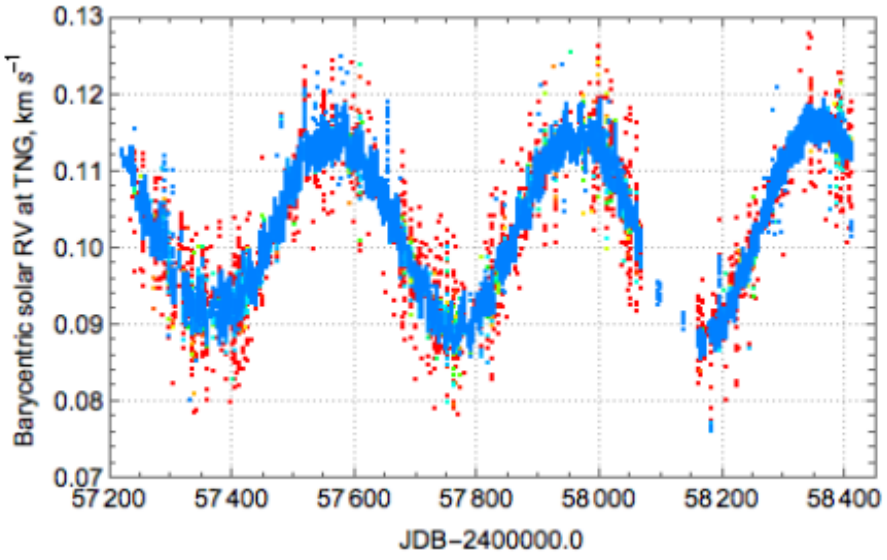
LCST (Low Cost Solar Telescope) operating daytime.
It feeds HARPS-N spectrograph.

Three years of Sun-as-a-star radial-velocity observations on the approach to solar minimum.

SUBMITTED

A. Collier Cameron,[1,15]★ A. Mortier,[2.1] D. Phillips,[3] X. Dumusque,[4] R. D. Haywood,[3,16]





LOCNES: Low Cost NIR Extended Solar Telescope

Claudi R.[a], Ghedina A.[b], Pace E.[c], Gallorini L.[c], Di Giorgio A.–M.[d], Liu S.–J.[d], Tozzi A.[e], Carleo I.[a], Lanza A.F.[f], Micela G.[g], Molinari E.[h], Poretti E.[b], Phillips D.[g], and Tripodo G.[i]

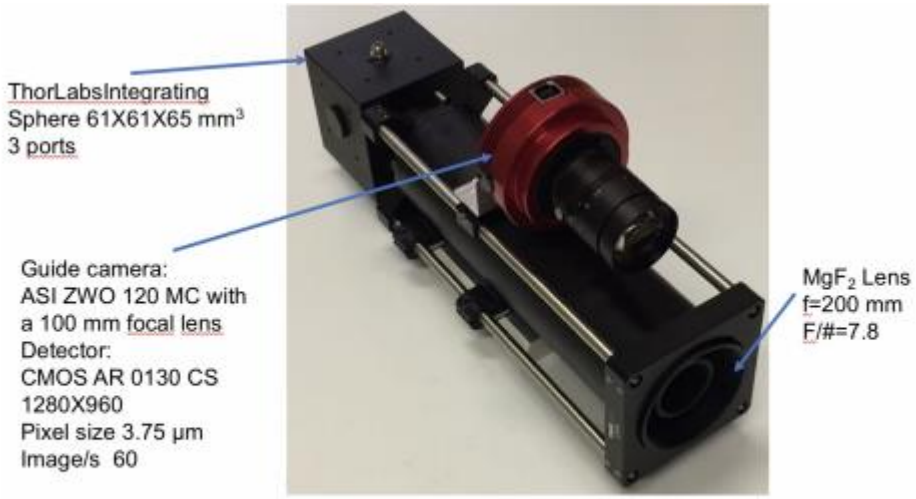
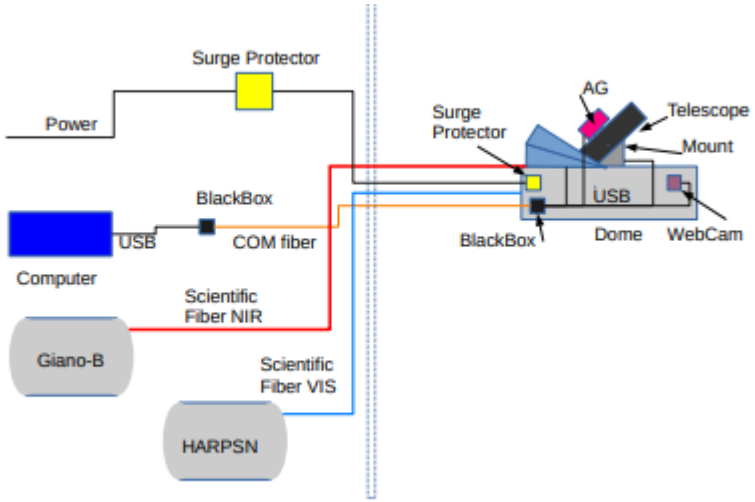
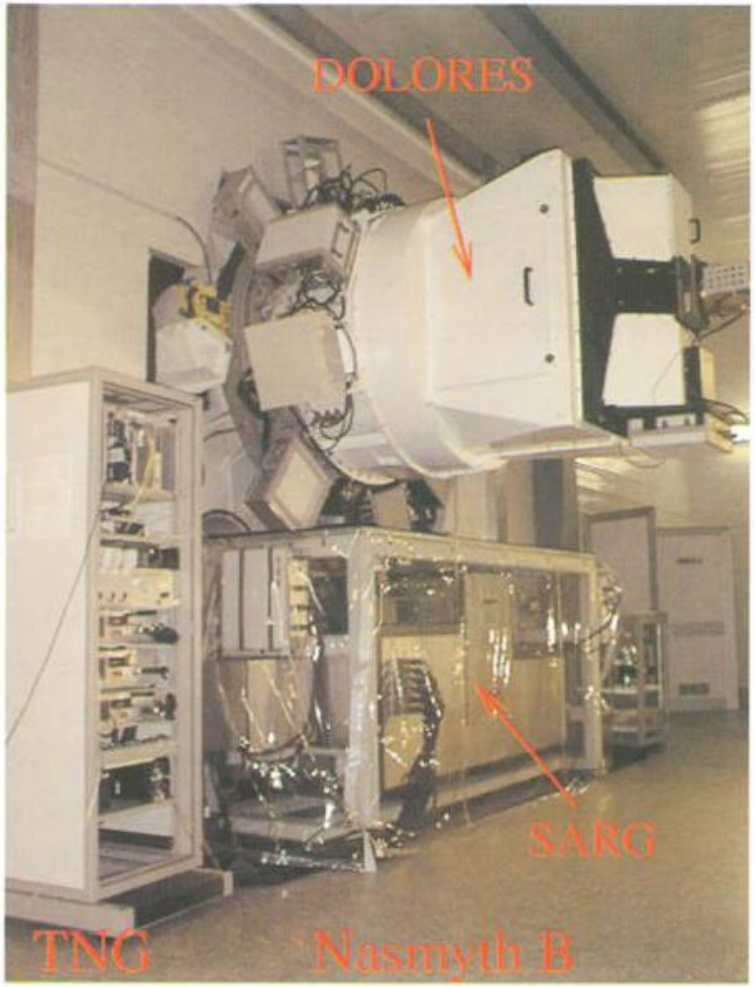
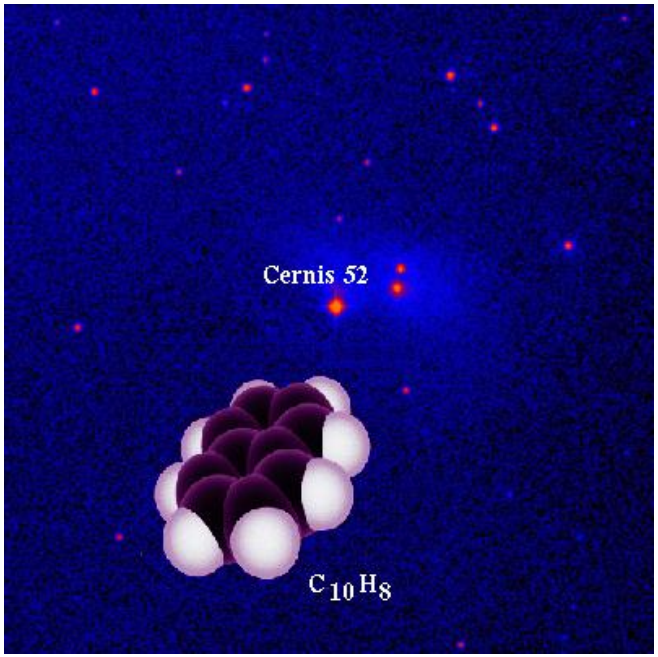


Figure 3. The LOCNES telescope.



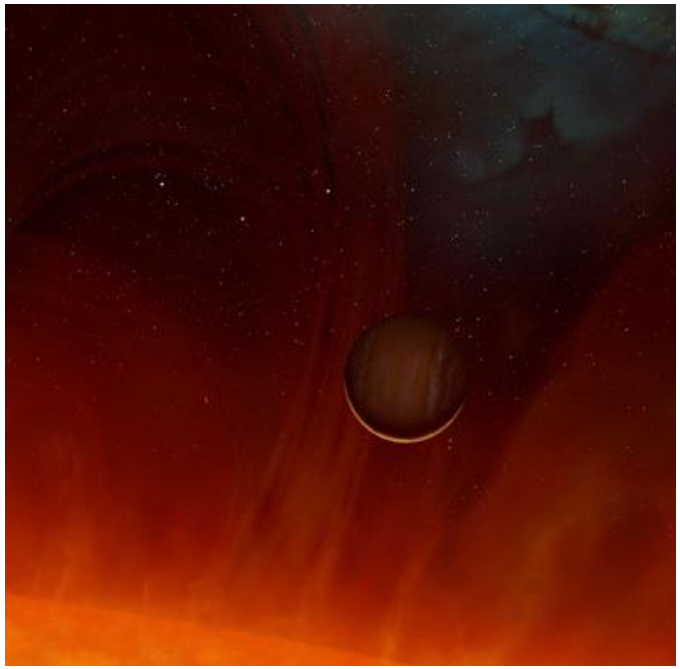
GIANO





Napthalene in the interstellar space

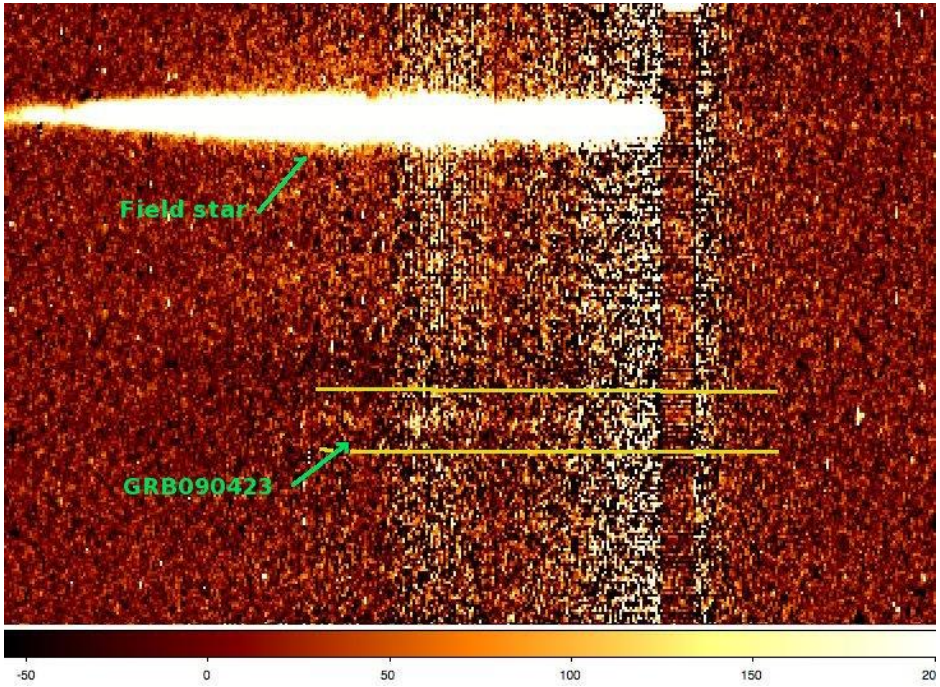
Iglesias Groth et al. 2008

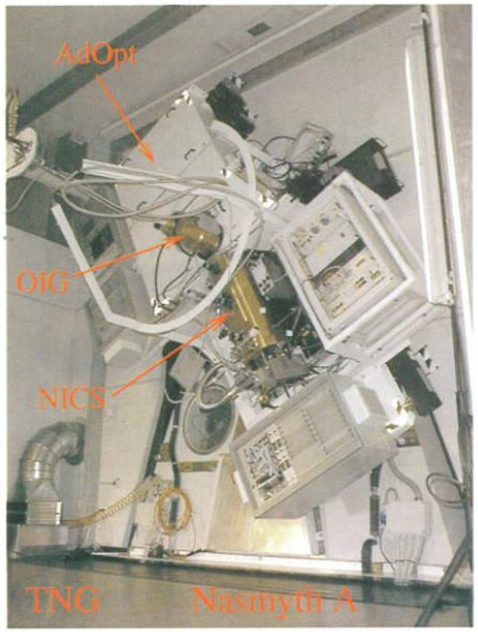


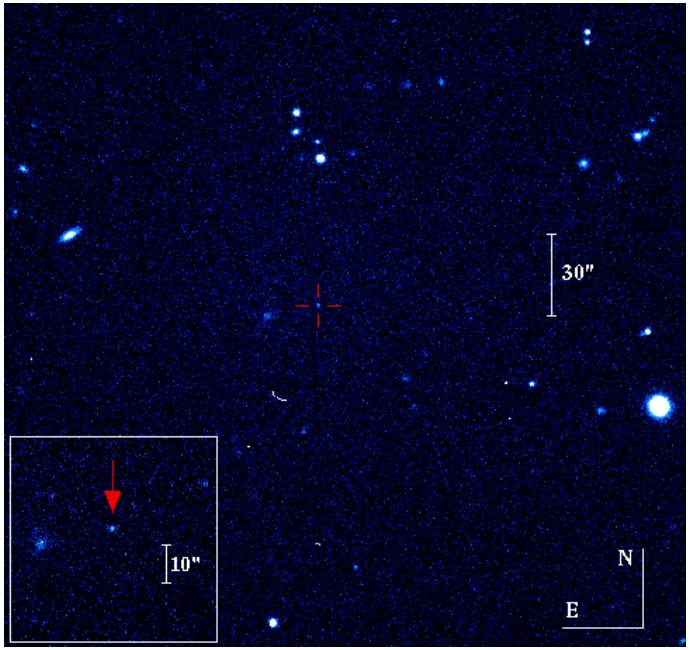
A giant planet orbiting the 'extreme horizontal branch' star V 391 Pegasi

Silvotti et al. 2007

The TNG caught the farthest GRB (090423) ever observed : z=8.2 *(Salvaterra et al. 2009)*



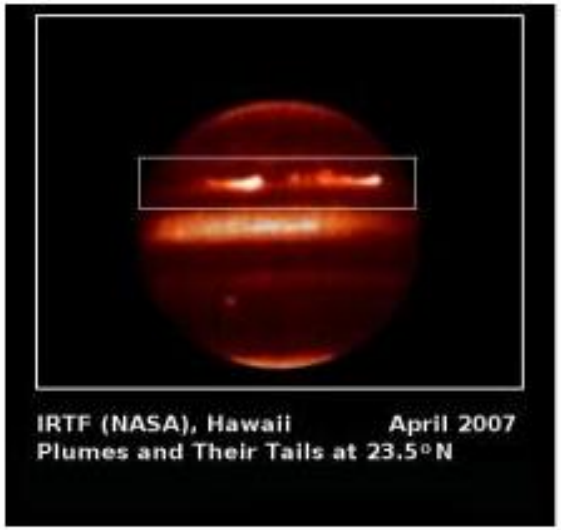


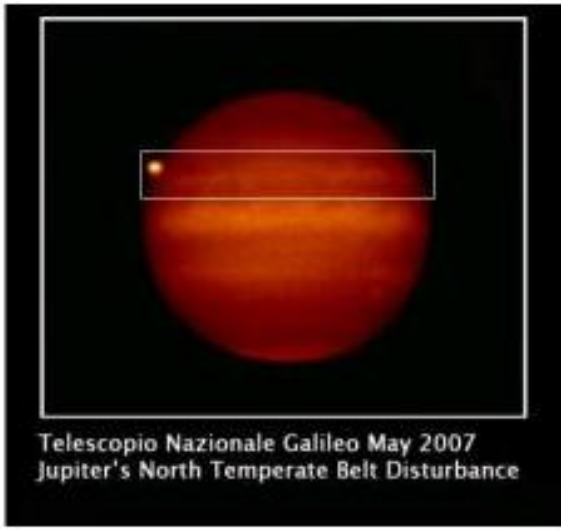


The farthest (z=2.6) short GRB (090426) ever observed *(Antonelli et al. 2009)*

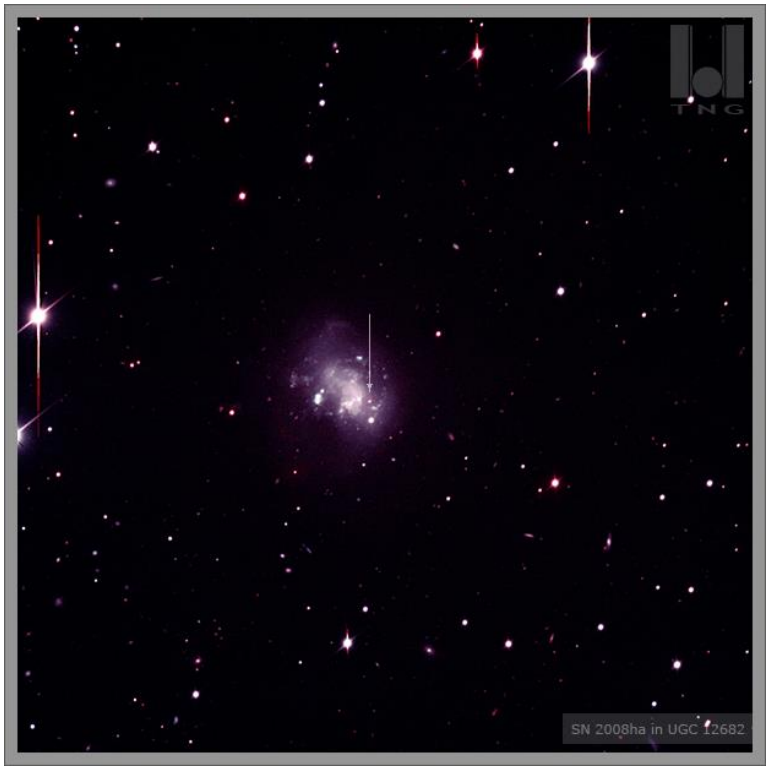
Perturbations in the atmosphere of Jupiter. NICS image *(right)*

(A. Sanchez-Lavega, et al., 2008)





Dolores V and R images



SN2008ha in UGC 16281
no hydrogen lines!

Valenti et al. 2009

Models of 10199 Chariklo

(Dotto et al. 2003)

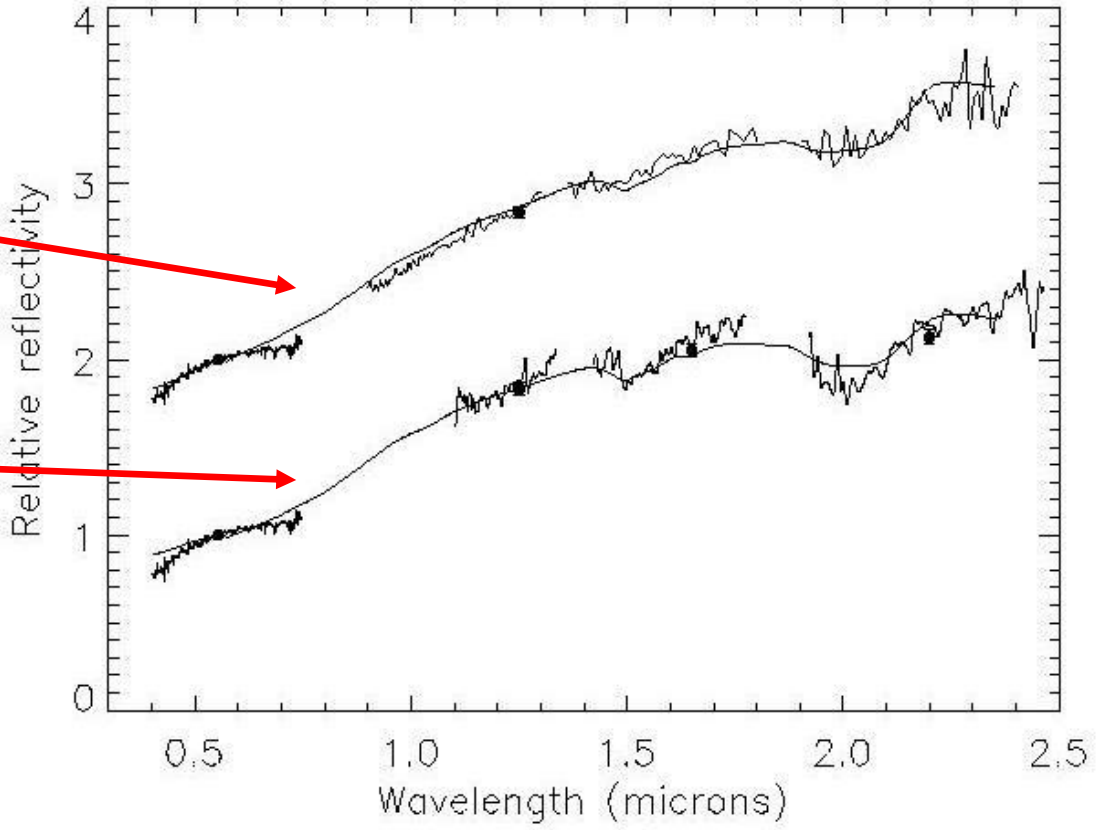
Geographical mixtures of :

2002 - TNG:

12% Triton tholins + 2% water ice + 6% Titan tholins + 80% amorphous carbon

2001 - VLT:

3% Triton tholins + 2% water ice + 9% Titan tholins + 86 % amorphous carbon



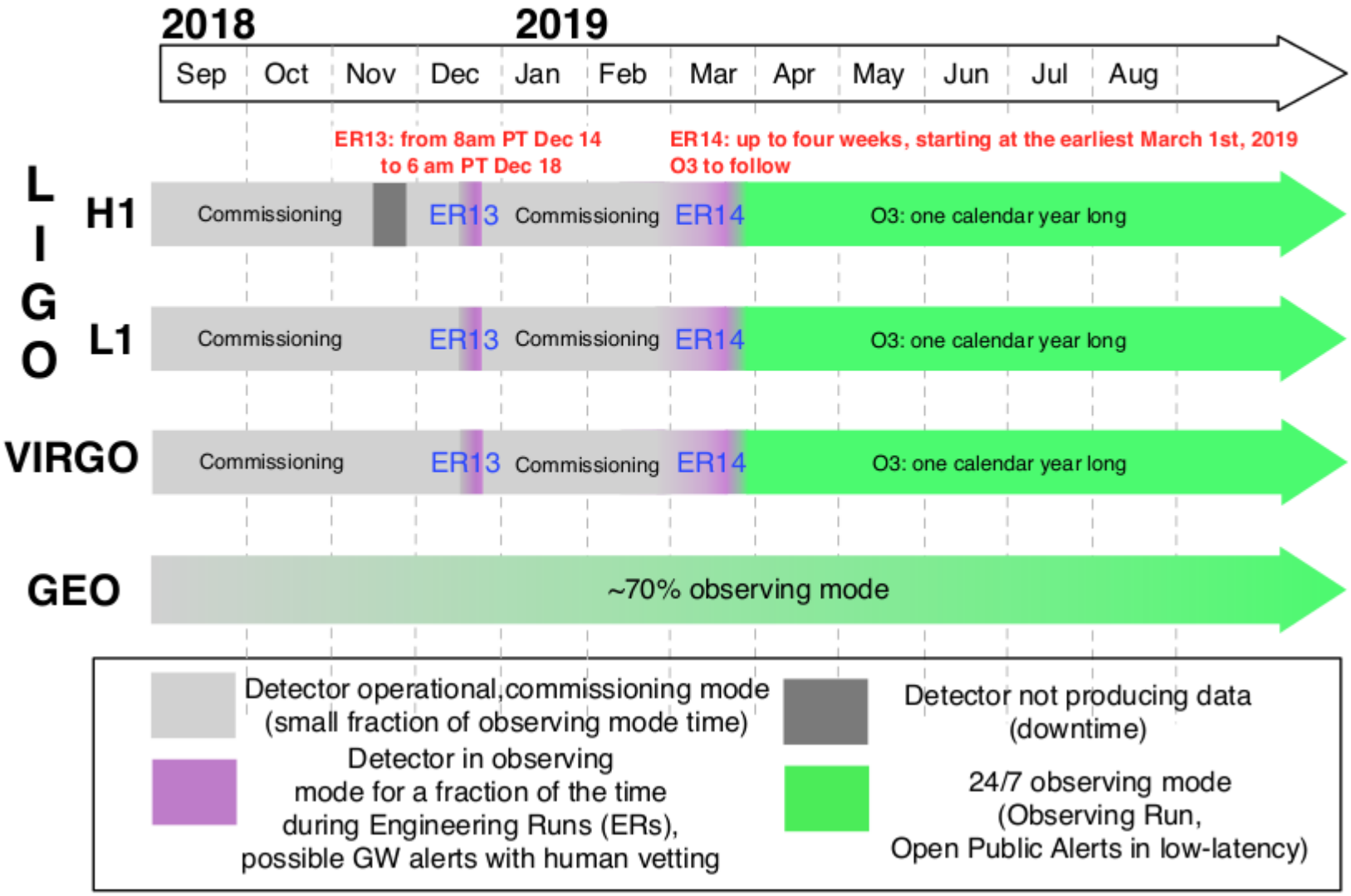
Titan and Triton tholins are synthetic compounds, produced by ion irradiation of gaseous mixture of N_2:CH_4

LIGO-VIRGO Joint Run Planning Committee

LIGO-G1801056

Working schedule for O3

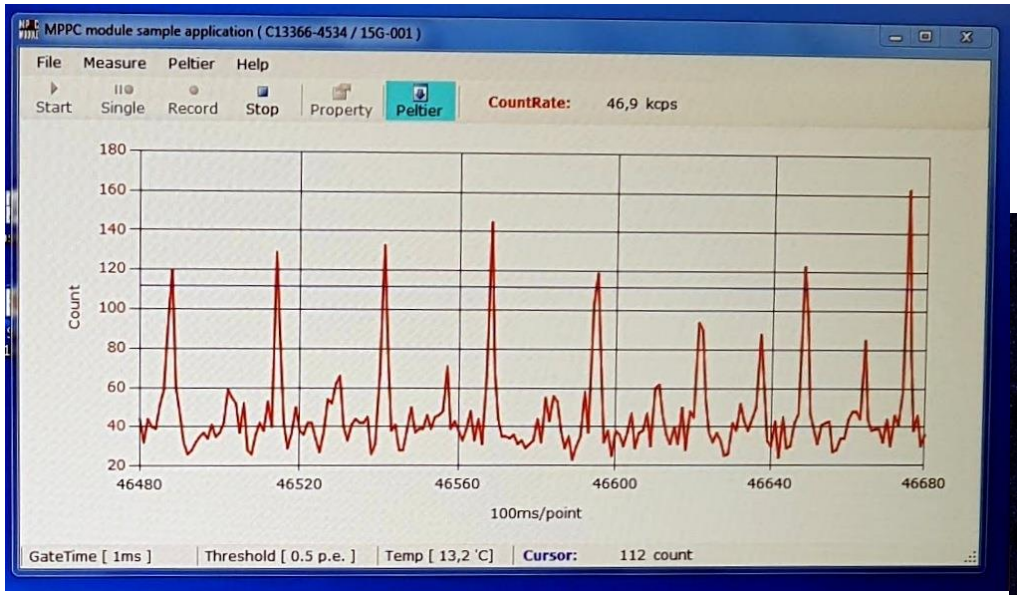
(Public document G1801056-v4, based on G1800889-v7)

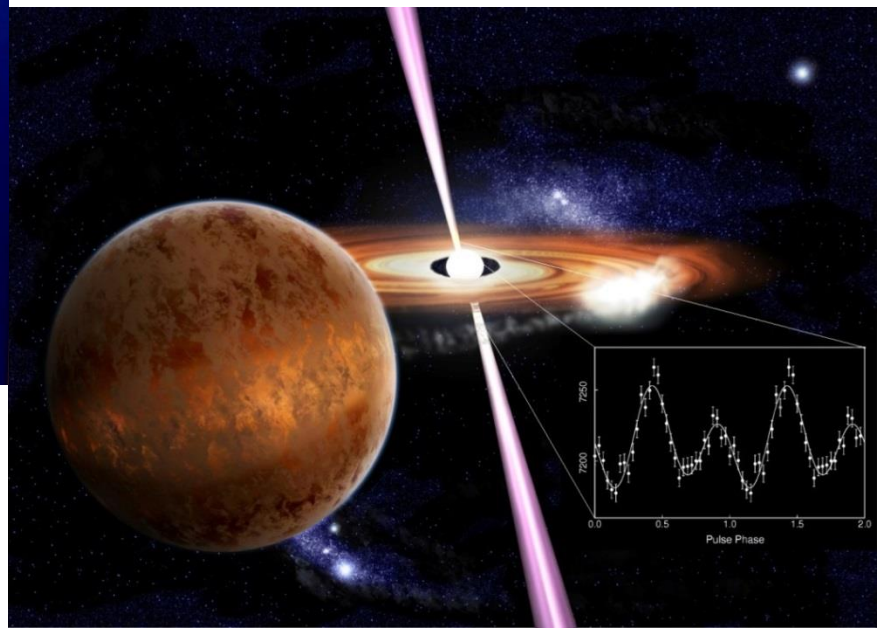


Pulses of visible light from a millisecond pulsar

(Ambrosino et al. 2017, Nature Astronomy)

Silicon Fast optical Astronomical Photometer (SiFAP) visitor instrument

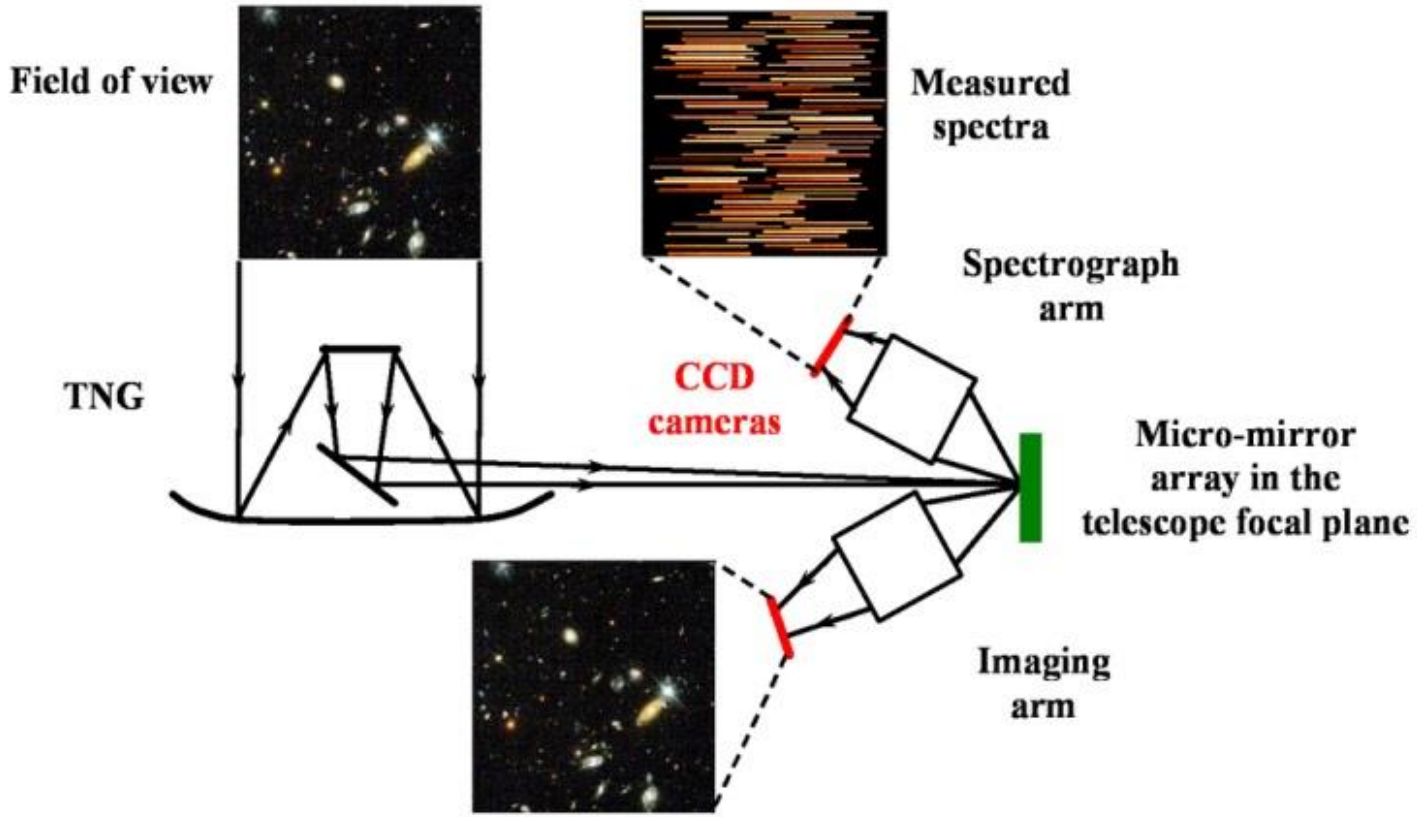




First light of SiFAP2 on November 14, 2018

BATMAN : a compact spectro-imager

Frederic Zamkotsian et al., SPIE Proceedings



Baseline of BATMAN

Primary mirror diameter	3.6 m
Field of view	6.8 arcmin x 3.6 arcmin
Focal ratio	F/4 on DMD (with 2048 – 1080 micro-mirrors) Plate scale = 0.2 arcsec per micromirror
Beams on DMD	incoming light at normal incidence out-coming light at 24°DMD orientation at 45°
Wavelength range	400 - 800 nm
Spectral resolution	R=560 for 1arcsec object (typical slit size)
Two arms instrument	one spectroscopic channel and one imaging channel
Detectors	Two 2k x 4k CCDs

BATMAN on the sky is of prime importance for characterizing the actual performance of this new family of MOS instruments, as well as investigating the operational procedures on astronomical objects.

Frederic Zamkotsian et al., SPIE Proceedings

CONCLUSIONS AND PERSPECTIVES

Currently, two highly requested instruments, GIANO-B and HARPS-N, and their combined observing mode, GIARPS

DOLORES and NICS available for Gravitational Waves follow-up programs

SiFAP2 expected to play a key role in fast photometry (PI Instrument)

BATMAN in stand-by mode

TNG staff deeply involved in building the WEAVE archive

TNG staff (minor) participation in SOXS (visible detector WP)

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New ideas welcome

Working group of instrumentation at the Roque de los Muchachos Observatory recently appointed. First meeting scheduled in November 2019


THE REAL THING
SOUND ON THE GOOSE
GENUINE PACT