ChETEC-INFRA TNA
Molėtai Astronomical Observatory

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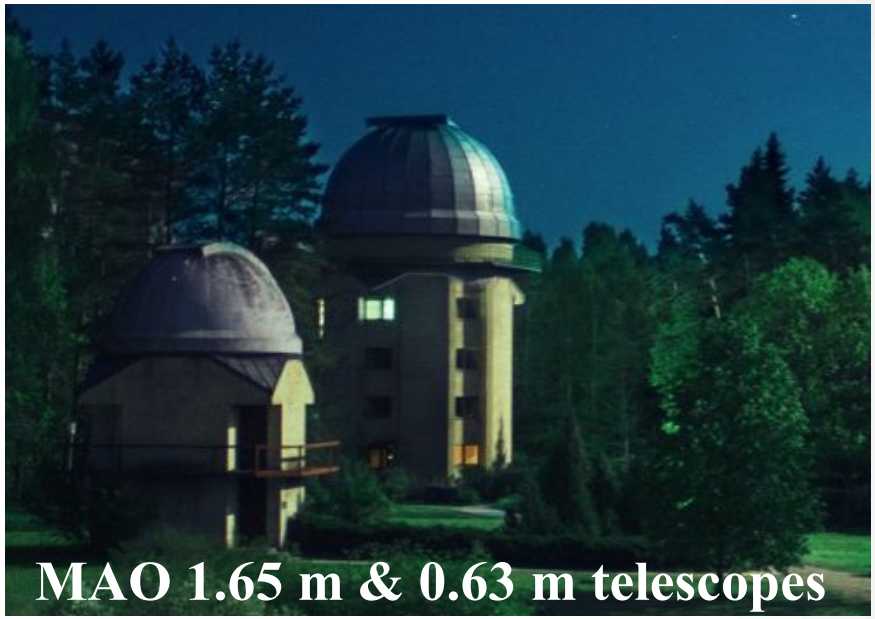
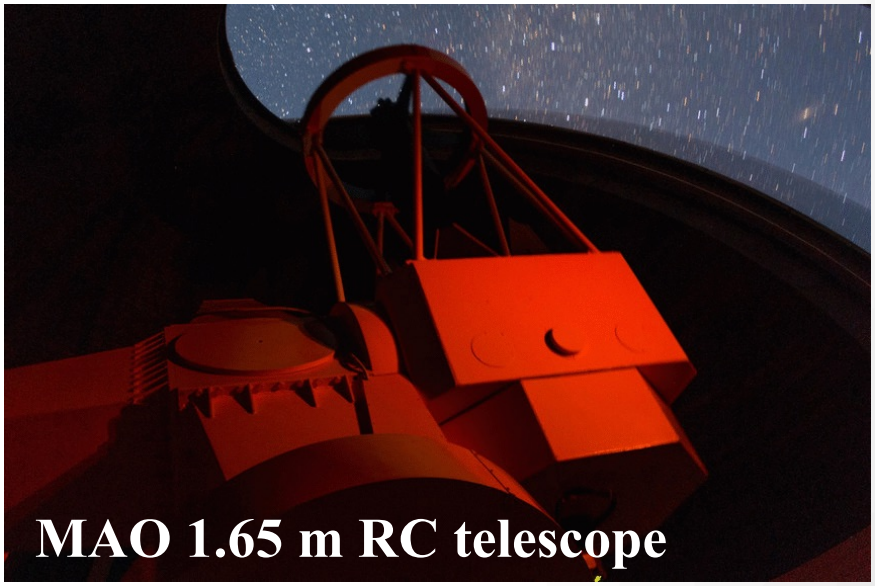
MAO for ChETEC-INFRA TNA: overview

- Location: 25º33′48.0″ +55º18′57.5 (~70 km north of Vilnius, Lithuania)
- Telescopes and instruments:
  - 1.65 m Ritchey-Chretien: VUES hi-res spectrograph, CORAVEL radial velocity instrument, 2kx2k CCD camera (*UBVRI*, Vilnius systems)
  - 0.63 m Cassegrainian + 2kx2k CCD camera (*UBVRI*, Vilnius systems)
  - 0.35/0.51 m Maksutov + 2kx2k CCD camera (*UBVRI*)
- Astroclimate:
  - ~80 clear nights/year



MAO 1.65 m & 0.63 m telescopes



MAO 1.65 m RC telescope

MAO for ChETEC-INFRA TNA

1.65 m Ritchey-Chretien telescope + VUES spectrograph

- Telescope:
  - 1.65 m primary, 0.45 m secondary
  - 1:3 primary, 1:12 Ritchey-Chretien
  - 35′ FOV
  - remote operation (optional)

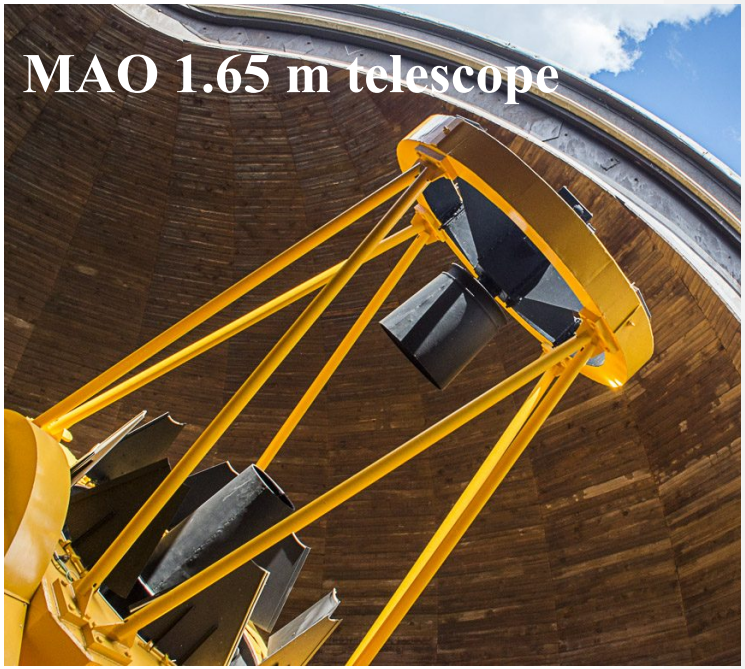


Table 1. The MAO 1.65 meter telescope specifications.

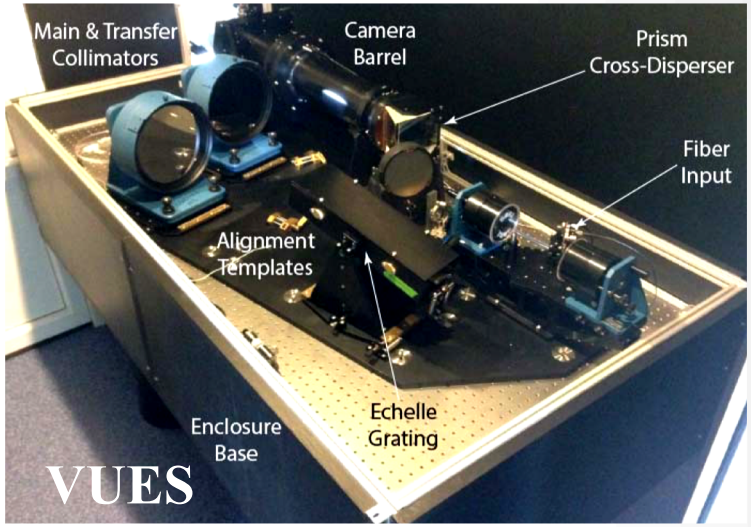
Parameter	Specification
Telescope Architecture	Ritchey-Chretien
Primary Diameter	165 cm
Primary Focal Length	492 cm
Secondary Diameter	45 cm
Focal Ratio	1:12
Equivalent Focal Length	1968 cm
Field of View	35 arcminutes

Jurgenson et al. (2016), Journ. Astron. Instr., 5, id1650003-239

MAO for ChETEC-INFRA TNA

1.65 m Ritchey-Chretien telescope + VUES spectrograph

- Vilnius University Echelle Spectrograph (VUES):
  - single-object Echelle fiber spectrograph
  - 400–880 nm, R=36000, 51000, 68000
  - stellar abundances V<10
  - radial velocities V<12



http://mao.tfai.vu.lt

Parameter	Specification
Wavelength Range	400 to 880 nm
Spectral Resolution Modes	30,000/45,000/60,000
Spectral Sampling	4 pixels for the highest resolution mode
Instrumental Throughput	25% at 543 nm
On-sky Fiber Aperture	2.5 arcseconds
Spectrograph Enclosure Temperature Stability	± 1C over 12 hours
Front-End Module Operational Temperature Range	-30C ≤ T ≤ +30C
Spectrograph Detector	4k x 4k x 15 μm pixel pitch
Instrument Control Software	GUI based observer interface
Data Reduction Software	Quick-look assessment & full data extraction pipeline

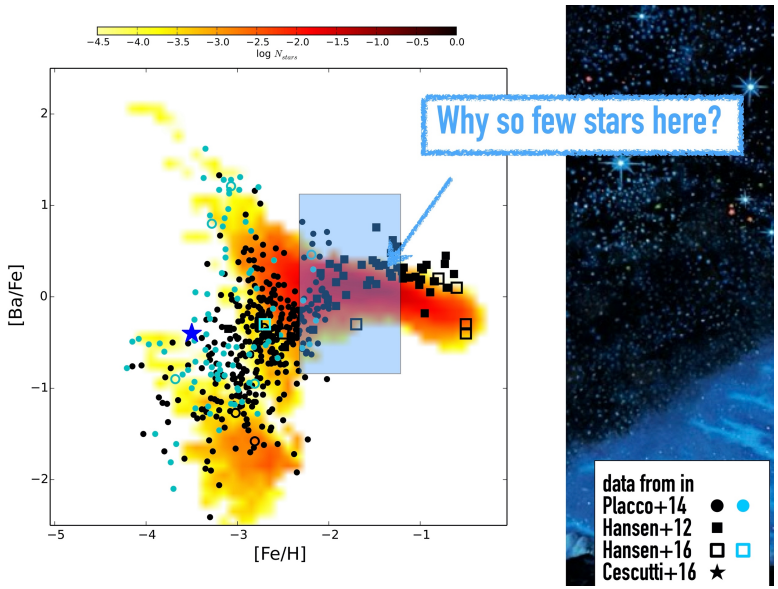
Jurgenson et al. (2016), Journ. Astron. Instr., 5, id1650003-239

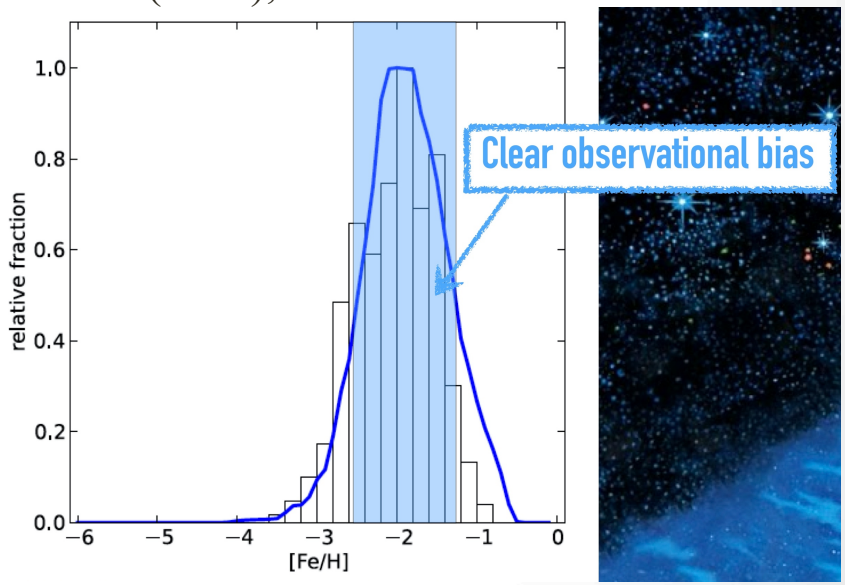
MAO for ChETEC-INFRA TNA

Science with VUES

- MINCE survey: Measuring at Intermediate Metallicity Neutron Capture Elements:
  - PI: Gabriele Cescutti (Trieste/INAF)
  - ChETEC project spin-off
  - VUES spectra of 24 stars obtained so far, observations ongoing

Cescutti (2020), ChETEC Period 4 Main Event



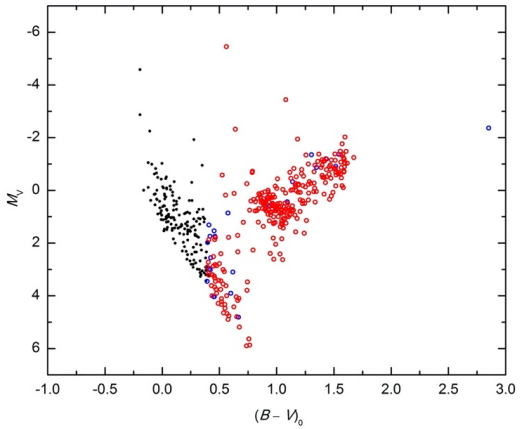


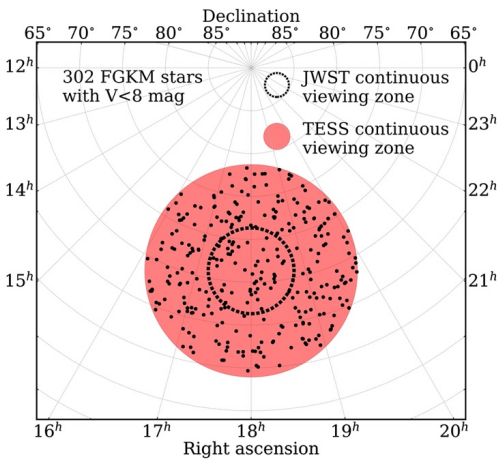
MAO for ChETEC-INFRA TNA

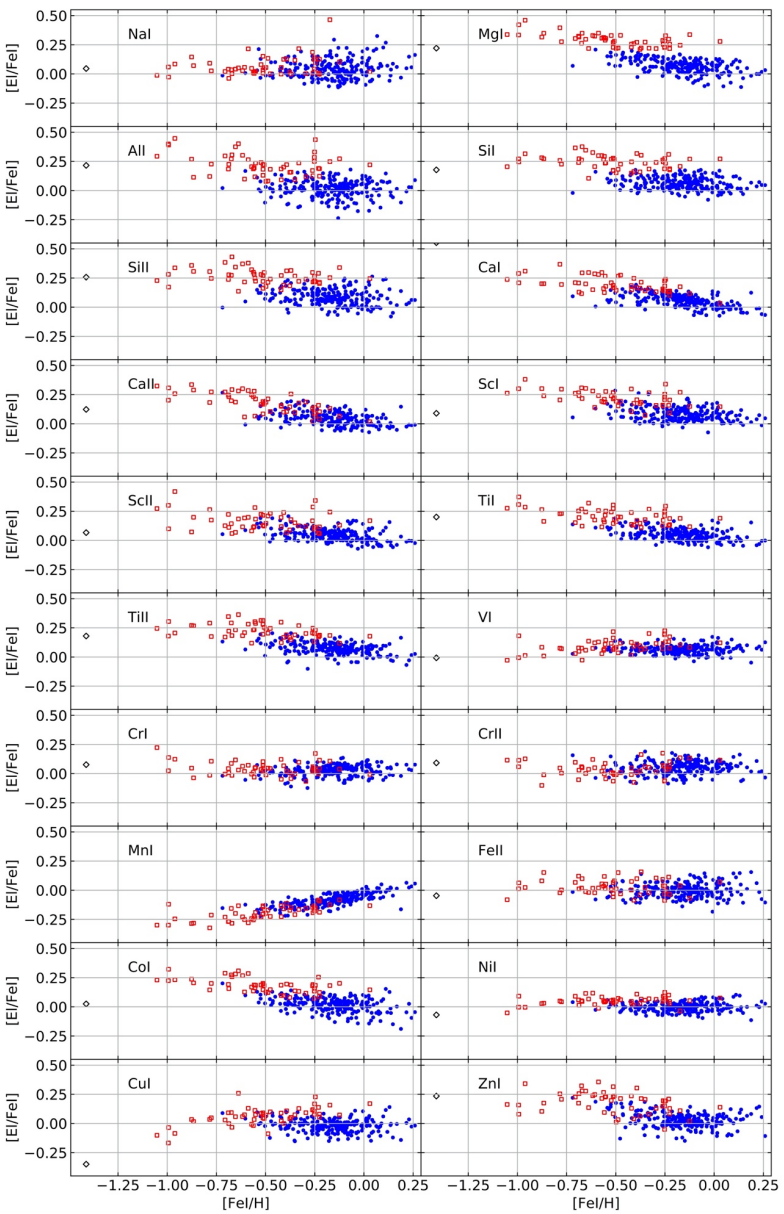
Science with VUES

- TESS follow-up:
  - VUES survey of ~300 bright (V<8) TESS targets
  - kinematical properties and abundances (24 elements)

Tautvaišienė et al. (2020), ApJS, 248, 19







MAO for ChETEC-INFRA TNA

Science with VUES

- Radial velocity survey of K-M dwarfs
- Binary stars: orbital parameters

Sperauskas et al. (2019), A&A, 626, A31

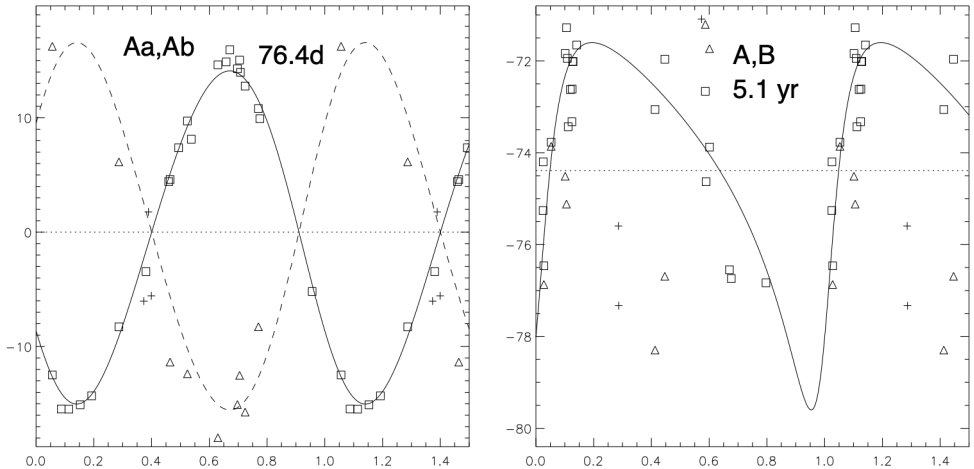


Fig. 3. RV curves of HIP 13460. *Left*: inner subsystem, $P = 76.4$ d. *Right*: outer subsystem, $P = 5.1$ yr. Radial velocities derived from blended dips are plotted as crosses and are given small weights in the orbit fit.

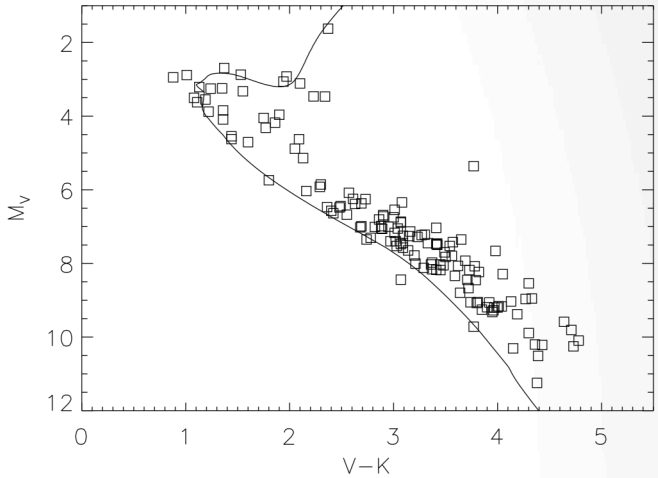


Fig. 1. Color-magnitude diagram of stars from Table A.1. The line is a 4 Gyr isochrone for solar metallicity from Bressan et al. (2012). The discrepant point is caused by the erroneous parallax of BD−08 2689.

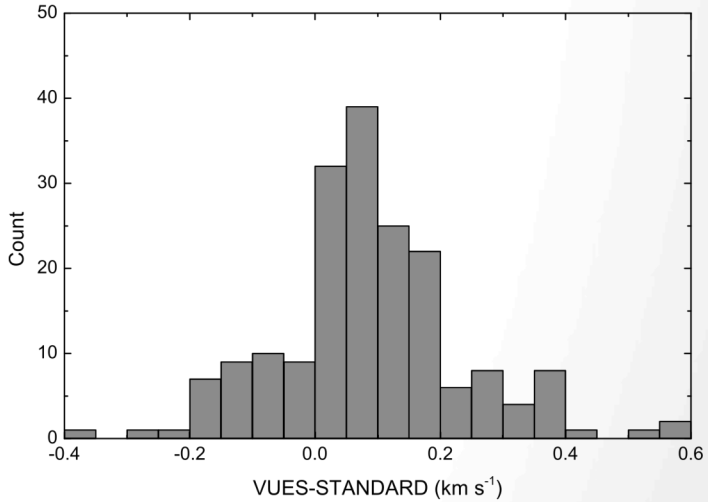


Fig. 2. Radial velocities of IAU RV standard stars measures by VUES. The histogram of the RV difference is plotted.

MAO for ChETEC-INFRA TNA

Access to MAO/VUES via ChETEC-INFRA TNA

- A total of 72 nights available for ChETEC-INFRA TNA (2021-2024)
- Applications for observing time via the ChETEC-INFRA TNA platform (see talk of Konrad Schmidt)
- Applications reviewed 4 times/year (MAO: Feb, May, Aug, Nov)
- Mode of operation: service
- **Collaborative efforts especially encouraged!**

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