The 2-meter telescope of the National Astronomical Observatory – Rozhen

Institute of Astronomy

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1. Who we are and where we are?
2. The 2-meter telescope – main characteristics and observational modi, examples
3. Recent upgrades, illustrations
4. Future plans, dreams
5. Education and outreach
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Who we are?

Institute of Astronomy
National Astronomical Observatory - Rozhen

Staff: 79 permanent positions, 35 scientific members

Research topics:

- Sun
- Solar System
- Nonstationary stars
- Stellar atmospheres and envelopes
- Chemically peculiar stars
- Stellar clusters
- Galaxies
- Wide field plate data base
NAO is at altitude of 1750 m, 30 km N from Smolyan (35 000) and 15 km SE from Chepelare (8 000).

\[ \lambda = 24^\circ 45' \text{ E}, \quad \phi = +41^\circ 41.5' \]
National Astronomical Observatory – Rozhen
The dome of the 2-meter telescope
2m telescope – optical scheme and instruments

- 2-channel focal reducer
- CCD cameras of 1K-class
- Coude focus - spectrograph: F = 72 m, 2.8"/mm
- RC focus: F = 16 m, 12.8"/mm
- Photometer
High-resolution astro-spectroscopy

Despite the lower (compared to the best examples) spectral resolution our spectrograms are valuable for studying the physical conditions in the stars.

**NAO - performances**

The RV accuracy of a single frame is about 5-10 km/s
2-m Ritchey-Chretien-Coude telescope

Evolution of the light echo after the outburst of V838 Mon in January 2002
2-channel Focal Reducer Rozhen (FoReRo2)

Modes of Observations

1. Broadband imaging
2. Narrowband imaging
3. Long slit spectroscopy
4. Fabry-Perot imaging
5. Imaging polarimetry
FoReRo2, an example
Narrow band imaging of comet Q4 (NEAT)

On-line, 616 nm, H$_2$O$^+$

Off-line, 642 nm, Continuum
Comet Q4 (NEAT), May 26, 2004
$\text{H}_2\text{O}^+$ ions in the near nucleus region
Comet Q4 (NEAT), May 26, 2004

Dynamics of the
\( \text{H}_2\text{O}^+ \) ions in the near
nucleus region

11 frames
\( \times \) 300 sec exposure
Total time of the
sequence \(<\ 1\ h\)
Recent upgrades, autoguiding system, 2006
(thanks to UNESCO-BRESCE for funding)

The autoguider Box

Inside of the Autoguider
Recent upgrades – 2008
new coating of the optics
(thanks for funding from the Bulgarian academy of sciences)
Running upgrade – 2009
new control system for the 2-meter telescope

1. March 26 2009 - Contract signed with the company Projectsoft.
2. In the last 2 years Projectsoft produced CSs for 2 other 2-meter telescopes made by Carl-Zeiss: Ondrejov and Terskol.
3. The design of the new CS is based on Siemens industry controllers.
4. High reliability, improved pointing accuracy, optimized positioning strategy, remote control, …
5. According to the negotiated schedule the new CS should be commissioned in September 2009.
6. Funding comes from a project with the National science fund (contract No. DO 02-85).
Running upgrade – 2009
Optical fiber connectivity with the external world

Should be performed during the summer
and commissioned in September

Planned upgrade – 2009 – 2011 (?)
new echelle spectrograph for the 2-meter telescope

1. FEROS like design
2. Fiber fed, bench mounted, …
3. Presently, the available funding can cover the purchase of
some components only. In order to keep the schedule we will
start with the items which require most time between order and
delivery.
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Practical school on spectroscopy, October 2007
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Learning the processing of spectroscopic data

In the camera room of the coude spectrograph
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Recent development – improved conditions for conducting of workshops and schools

before

now
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Public outreach
Partner organizations of the Institute abroad are more than 100 institutions from Austria, Belgium, Canada, Estland, France, Germany, Greece, Hungary, Italy, Japan, Poland, Romania, Serbia, UK, USA, Russia, Ukraine, etc.

The institute is an active member of the SUB-REGIONAL EUROPEAN ASTRONOMICAL COMMITTEE (SREAC), sponsored by UNESCO-BRESCE.

Recently the Bulgarian Academy of Sciences was recognized as an associate partner of ASTRONET. Key role in this case has the Institute of Astronomy with the 2-meter telescope in the National astronomical observatory.

OPTICON?