New Bulgaria-Austrian project ‘Joint observations and investigations of solar chromospheric and coronal activity’

Rositsa Miteva[1],
Werner Poetzi[2],
Astrid Veronig[2],
Kamen Kozarev[1],
Momchl Dechev[1],
Robert Jarolim[2],
Mohamed Nedal[1],
Nikola Petrov[1],
Stefan Purkhard[2],
Christof Schirninger[2],
Tsvetan Tsvetkov[1],
Yovelina Zinkova[1]

(1) IANAO-BAS, Bulgaria https://astro.bas.bg/
(2) University Graz, Austria https://physik.uni-graz.at/en/

http://space.bas.bg/SES/EN/

https://astro.bas.bg/project-sun/

Aims

AIM

1

To set up the Rozhen Chromospheric Telescope (RCT), and develop standardized solar observing methodology and products, complementary to the Kanzelhohe Patrol Instrument (KPI) by means of strong technical cooperation between the team members.

2

To carry out combined solar observations with the two instrument suites and external (freely available space-based) resources, in order to study chromospheric signatures of quiet sun and pre-eruptive active regions and multi-wavelength manifestation of solar eruptive phenomena, their morphology and kinematics.

https://astro.bas.bg/project-sun/

Project structure

Work Packages

Work Package #1

Technical support of NAO-Rozhen Chromosphere Telescope and observation campaigns with KSO facilities

- Task 1.1: Telescope installation
- Task 1.2: Data processing
- Task 1.3: Observation Campaign
- Task 1.4: Image enhancement

Work Package #2

Joint investigations of solar chromospheric and coronal activity

- Task 2.1: Chromospheric Signatures of Quiet Sun and Pre-Eruptive Configurations
- Task 2.2: Multi-wavelength study of solar activity phenomena, their morphology and kinematics

Work Package #3

Dissemination of the project results

- Task 3.1: Project web-site
- Task 3.2: Scientific dissemination

Infrastructure: NAO-Rozhen

Credit: Petrov (2021)

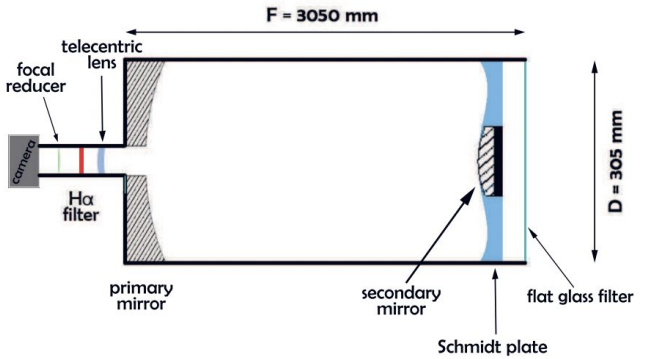
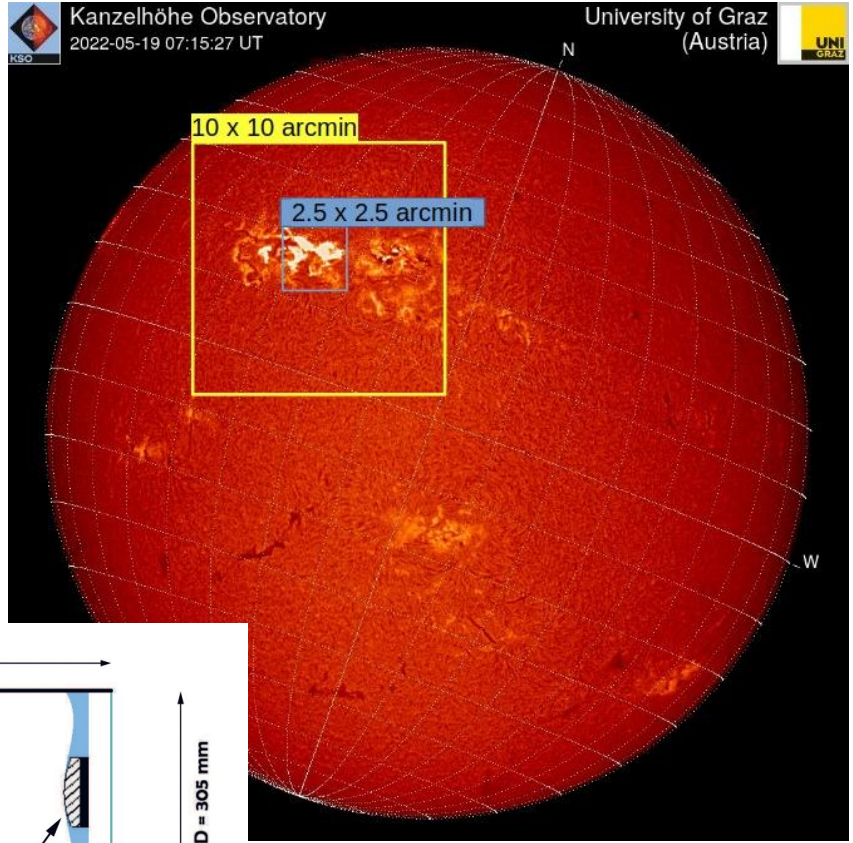


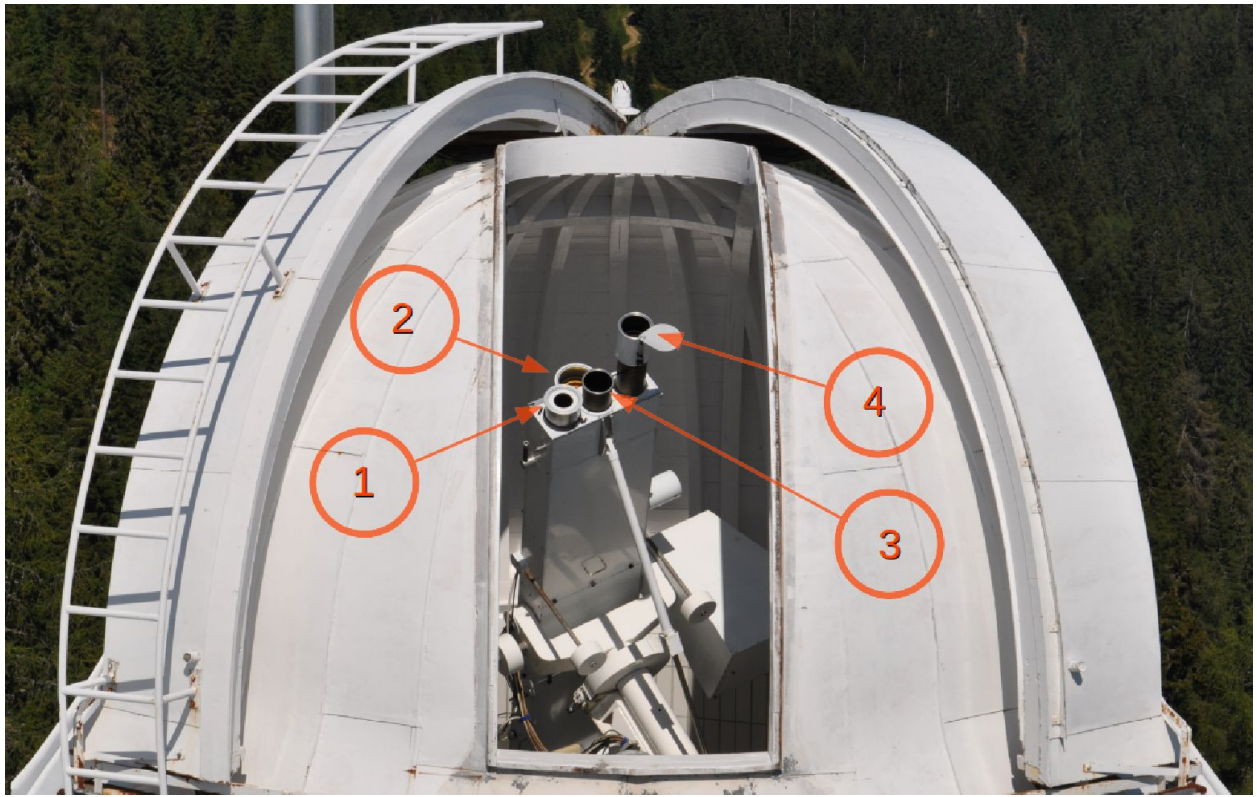
Figure 1: Optical scheme of the Schmidt–Cassegrain telescope.



Credit: W. Pötzi

http://cesar.kso.ac.at/

Infrastructure: Kanzelhöhe Solar Observatory



The Kanzelhöhe Patrol Instruments:

- Ca II K: A refractor with a diameter of 100 mm and a focal length of 1 500 mm.
- White-light: A refractor with an objective lens of 130 mm and a focal length of 2000 mm; the broadband filter with a FWHM of 100 Å is centered at 5 460 Å.
- Hα: A refractor with 100 mm diameter and a focal length of 1 950 mm; the Zeiss Lyot Hα filter with a central wavelength of 6 562.8 Å and a FWHM of 0.7 Å is placed behind a broadband Hα pre-filter.
- Drawing Device: projected image with a diameter of 25 cm

Team members

- 7 BG teambers (incl. 2 PhD students)
- 5 AT teambers (incl.3 PhD students)

Rositsa Miteva BG
Co-PI (BG)

Topics of research:
- solar energetic particles
- solar flares
- geomagnetic storms
- radio bursts

https://orcid.org/0000-0002-0938-5678

Werner Pötzi AT
Co-PI (AT)

Topics of research:
- telescope and data pipeline
- data analysis (image analysis)
- data presentation
- the solar cycle

https://orcid.org/0000-0003-4811-0543

Astrid Veronig AT
Prof. (Uni Graz)

Topics of research:
- solar flares
- CMEs
- space weather
- coronal magnetic fields

https://orcid.org/0000-0003-2073-002X

Kamen Kozarev BG
Assoc. Prof. (IANAO)

Topics of research:
- energetic particles
- shock waves, CMEs
- radio observations
- machine learning

https://orcid.org/0000-0002-6591-4482

Momchil Dechev BG
Assoc. Prof. (IANAO)

Topics of research:
- eruptive prominences
- solar flares
- CMEs
- solar energetic particles

https://orcid.org/0000-0002-2049-4998

Robert Jarolim AT
PhD Student (Uni Graz)

Topics of research:
- deep learning
- image processing
- physics-informed neural networks
- automatic detection, big Data

https://orcid.org/0000-0002-9309-2981

Mohamed Nedal BG
PhD Student (IANAO)

Topics of research:
- solar coronal waves
- solar energetic particles
- solar radio bursts
- space weather forecasting

https://orcid.org/0000-0001-9333-6539

Nikola Petrov BG
Assoc. Prof. (IANAO)

Topics of research:
- quiescent and eruptive prominences
- solar eclipses
- solar corona...

https://orcid.org/0000-0002-2443-2815

Stefan Purkhart AT
PhD student (Uni Graz)

Topics of research:
- solar flares
- hard X-rays with STIX
- plasma heating
- nanoflares

https://orcid.org/0000-0002-4238-4722

Christoph Schirninger AT
PhD Student (Uni Graz)

Topics of research:
- solar image reconstruction
- deep learning
- image enhancement
- image processing

https://orcid.org/0009-0004-2182-2596

Tsvetan Tsvetkov BG
Senior Assist. Prof. (IANAO)

Topics of research:
- destabilization and eruption of solar prominences
- solar activity
- total solar eclipses

https://orcid.org/0000-0002-5838-5244

Yovelina Zinkova BG
PhD Student (IANAO)

Topics of research:
- solar corona
- solar eclipses
- polarization techniques
- space weather

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https://oead.at/en/

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