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THE NEW 2-M RCC TELESCOPE IN THE NORTHERN CAUCASUS FOR MODERN ASTRONOMICAL RESEARCH

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A new 2-m Ritchey–Chretien–Coude (RCC) telescope in the Northern Caucasus (the Kabardin–Balkar Republic, Russian Federation) is nearing being put into operation. It has been developed by the National Academy of Sciences of the Ukraine on the Terskol peak (near Elbrus) which seems to be one of the best sites for astronomical ground observations in terms of its astroclimate. This paper describes the present status of the telescope, its instrumentation and outlines the scientific problems that can be solved using the telescope.

KEY WORDS Ground based astronomy, large optical telescopes

An astrophysical observatory has been created by the National Academy of Sciences of Ukraine in the Northern Caucasus. The observatory is located on the Terskol peak (near Elbrus) at 3100 m altitude. Precise and continuous measurements have shown that the astroclimate characteristics on the Terskol peak such as the number of clear nights, the image quality and the relative humidity meet the modern requirements for astronomical sites. The mean seeing is less than 1 arcsec. The Terskol peak is one of the best sites for astronomical ground observations in terms of the air transparency in the ultraviolet region and the low atmospheric water vapour content is favourable for astronomical observations in the infrared spectrum band.

The Observatory is equipped with the following modern optical telescopes:

- (1) 2-m Ritchey–Chretien–Coude telescope produced by Carl Zeiss Jena GmbH (Germany);
- (2) horizontal solar telescope;
- (3) two Zeiss-600 telescopes.

Table 1. The main parameters of the regular equipment of the 2-m RCC telescope on the Terskol peak

<i>System (parameters)</i>	<i>Values</i>
1 <i>Ritchey-Chretien system</i>	
Equivalent focal length	16000 mm
Field free from vignetting:	
linear diameter	300 mm
angular diameter	108 arcmin
1.1 Photographic plate size	300 mm × 300 mm
1.2 Transforming system and Schmidt cameras	F/1 and F/2
Camera focal length	50 mm and 100 mm
Image field: linear diameter	11 mm and 22 mm
angular diameter	18.6 arcmin
Focal length of the control field glass	420 mm
Ligth filters can be mounted in the parallel beam	
1.3 TV adapter at offset guide (controller)	
Angular size of the target field	3.6 arcmin
Light filter number on the capstan	5
1.4 Universal astronomical spectrograph UAGS	
2 <i>Coude system</i>	
Equivalent focal length	72 000 mm
Field free from vignetting	5 arcmin
2.1 Coude spectrograph	
Spectral band	320–900 nm
Schmidt camera focus	450, 875, 1900 mm
Collimators	D=197 mm, F=7100 mm D=300 mm, F=10740 mm
Spectrograph slit: height	0.02–3 mm
width	0.2–10 mm
Dispersion	2.6–37 Å mm ⁻¹

The 2-m RCC telescope has a parallactic mounting of a new type for large telescopes. It combines the following advantages of the fork and English mountings: unrestricted telescope motion from horizon to horizon; high rigidity; the presence of only two mirrors for the Coude focus.

The main features of the RCC telescope are:

- (1) high accuracy of the coordinate installation (less than 1 arcsec);
- (2) large undistorted field (1 degree);
- (3) high velocity of the telescope motion (up to 120 degree per minute);
- (4) programmed differential positioning over an arbitrary number of stars with an accuracy of 1 arcsec;
- (5) it is possible to mount heavy and large instrumentation into the Cassegrain focus;

- (6) the primary and replaceable secondary mirrors are arranged inside the telescope tube.

The principal parameters of the 2-m RCC telescope are given in Table 1.

Owing to its optical scheme, original mounting and control system, the RCC telescope represents by itself an astronomical complex of universal application. It can be used to investigating the fundamental problems of modern astrophysics and astrometry related to the origin, physics and evolution of the objects of the Universe (comets, planets and other Solar System bodies, stars, star clusters, nebulae, Galaxy, galaxies, etc.).

At the present time the creation of the 2-m telescope is nearing completion. The telescope tower has been built, and the dome with its auxiliary mechanisms is in operation. The basic telescope components have been installed including all optical devices and machinery. The telescope, the control panel and the auxiliary instrumentation have been connected to the electric power. The primary mirror has been installed and the telescope has been balanced. The observer platform and the telescope control system are in operation. The control system software has been installed and tested. The principal telescope operations have been tested, such as the telescope motion, its axes motion, hydrosystem control, petal shutter control, focus mechanism control and the ventilation system control. The telescope optical units are now being tuned.

The telescope is planned to be equipped with the following instrumentation in the near future:

- (1) CCD Echelle spectrograph in the Coude focus;
- (2) digital panoramic polarimeter;
- (3) panoramic infrared Fourier spectrometer (up to 10–15 μm);
- (4) CCD photometer–coordinatometer–photoguide;
- (5) CCD panoramic spectrometer with Fabry Perot interferometer;
- (6) astronomical infrared Fourier spectrometer.

The 2-m RCC telescope on the Terskol peak is expected to be ready for astronomical research in 1996. Proposals for international scientific cooperation at the Terskol Observatory are encouraged.

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