The Low-Resolution Spectrograph UVEX. First UV Tests at the Zeiss-2000 Telescope of the Peak Terskol Observatory

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Abstract. The low-resolution spectrograph UVEX with the spectral coverage from 300 nm to 900 nm was designed and manufactured in INASAN. The assignment of this instrument is registration of the spectra of various objects with spectral resolution of R≈1000. In this paper we describe briefly the UVEX spectrograph and present the first results from commissioning phase observations on the Zeiss-2000 telescope of the Peak Terskol observatory.

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1 Introduction

In 2019 the authors made a low resolution spectrograph UVEX designed for simultaneous registration of object radiation in the range from 300 nm to 900 nm with a resolution of R≈1000 (Nalivkin et al. 2019). An additional scientific advantage of the UVEX spectrograph is ability to obtain low-resolution spectra including the near ultraviolet range down to 300 nm, that is inaccessible at most observatories. UVEX spectrograph can fill the gap between ground-based and space observations, and can be used to provide ground support for space projects.

2 Short Overview of the UVEX Spectrograph

The UVEX spectrograph is based on the Czerny – Turner scheme and is optimized for use with telescopes with an aperture up to 0.5 m and focal ratio up to f/5. Standard optical elements made of fused silica with UV range coatings were used in the spectrograph. A stiff and stable optical compartment of the spectrograph was designed and manufactured. The UVEX is equipped with

a slit viewer unit with a guiding camera, a calibration unit, a power supply system and a calibration unit control scheme. The calibration unit contains an integrating sphere, a Fe-Ne spectral lamp with a hollow cathode, and a flat-field lamps for UV and visible spectral ranges. An ASI ZWO1600MM camera with a Panasonic MN34230PL CMOS sensor and a two-stage thermoelectric cooling system was used as a detector in the commissioning phase of UVEX. The entrance window was replaced with a fused silica window with an antireflection coating optimised for the 250 nm – 700 nm spectral range.

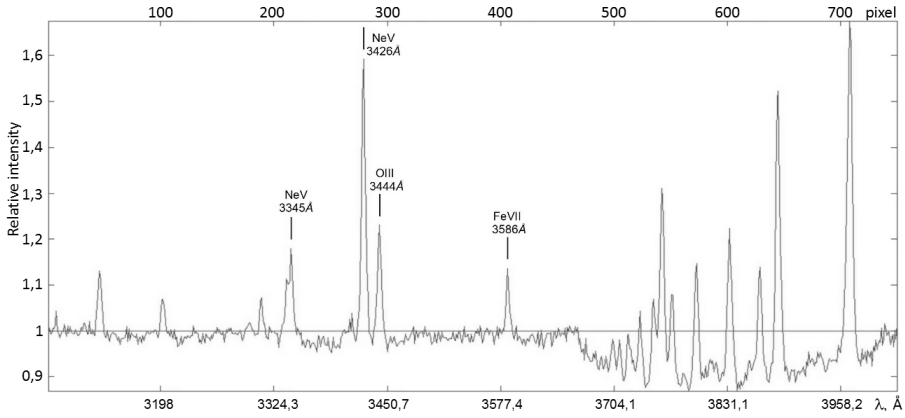

Fig. 1. UV part of the spectra of the Z And obtained with the UVEX spectrograph.

3 UVEX Comissioning Phase Observation Results

In November 2019, the first observations with the UVEX spectrograph were carried out on the Zeiss-2000 telescope of the Terskol Observatory with altitude of 3150 m. Stars of various spectral types and brightness with numerous emission lines and absorption lines in the UV range were used as objects for commissioning phase observations. The actual resolution of the spectrum in the middle of the spectral range from 307 nm to 911 nm was R = 1150 with a 16 μm slit. The possibility of registration of the entire spectrum in the whole spectrum range with single exposure has been confirmed. The UV spectrum part (300...400 nm) of a symbiotic star Z And is presented on Fig. 1.

Bibliography

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