

POULKOVO OBSERVATORY CIRCULAR

№ 2

Table of contents.

- N. Kosirev. Note on the Structure of Sunspots.
- V. Ambarzumian and N. Kosirev. Note on the Continuous Spectrum of Solar Faculae.
- E. Perepelkin. On Radial Velocities in the Chromosphere.
- G. Shajn. A Giant with Large Radial Velocity.
- G. Shajn. Sixteen New and Five Suspected Spectroscopic Binaries.
- V. Albitzky. List of Some Spectroscopic Binaries Discovered at Simeis with the 40-inch Reflecting Telescope.
- G. Tikhov. The Spectrum of Comet 1930 c (Wilk).
- D. Eropkin. Note on Telluric Lines.
- D. Eropkin. Note on the Transparency of the Terrestrial Atmosphere as Determined from the Eclipses of the Moon.
- I. Lehman-Balanowsky. Photographic Light Curves of the Variable VW and UZ Cassiopeiae.
- B. Okunev. Photographic Light Curves of RS Bootis and RR Leonis.

Note on the Continuous Spectrum of Solar Faculae.

In spring 1931 we obtained with the 30" refractor a series of solar faculae spectrograms by means of a three-prism spectrograph. The plates were standardized by means of a light-reducer. However, only on one plate (taken on May 19, 1931) the image of the facula observed in the western part of the solar disk at a distance of $0.94 R$ from the centre was sufficiently sharp. On the remaining plates the images of the faculae were hardly discernible in the solar spectrum forming their background.

The intensities of the continuous faculae spectrum were measured in four places by comparing them to the intensities of the non-perturbed regions of the solar spectrum on both sides of the facula along the spectrograph slit. Whence by interpolation the intensity of the facula spectrum was determined relatively to the spectrum of the solar disk region at the same distance from the disk centre. The following results were obtained.

λ	I
389.7	114
391.8	115
498.1	110
506.3	110.

For each wave length the intensity of the solar spectrum is taken as 100. The above table shows a certain excess of radiation in the violet region, denoting a greater effective temperature of the facula as compared to the effective temperature of the sun's surface. The effective temperature of the facula is only by 100° higher than that of the solar surface at the same distance from the centre.

The faculae apparently represent such regions of the sun's surface where a change from a state of monochromatic radiative equilibrium to a state of local thermodynamic equilibrium takes place in higher layers. Only that circumstance enables us to explain the fact that faculae are more distinctly seen at the edge of the solar disk, and that the number of atoms obtained from Ca^+ absorption lines are less than the corresponding numbers obtained from the normal solar spectrum. However the question why the faculae give a greater energy flux than the sun's surface, requires a special investigation from the theoretical standpoint.

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