

Spectroscopy of comet 67P/Churyumov-Gerasimenko at the 6-m telescope of the SAO RAS

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ABSTRACT

We present spectral observations of comet 67P/Churyumov-Gerasimenko performed at the 6-m telescope of the Special Astrophysical Observatory in November and December of 2015 and in April of 2016, on the outbound segment of its orbit between heliocentric distances 1.61 au and 2.72 au.

A focal reducer SCORPIO-2 with the transparent grisms VPHG1200 and VPHG2400 and a long-slit masks with 6.1'×1.0" and 6.1'×2.0" dimensions was used. The spectral resolution of spectra was about 5 Å in November, 2015 and April, 2016 and 4 Å in December, 2015 respectively.

CN, C₂, C₃, and NH₂ emissions were identified in the spectra of comet 67P on November 8 and December 9, 2015. Only CN emission was detected in the spectrum on April 4, 2016. The gas production rates of C₂, CN, C₃, and NH₂ were derived using a Haser model. According to the value $\log Q[C_2/CN] = -1.05$, comet 67P corresponds to “depleted” comets.

The spectra are characterized by a high level of continuum during all sets of observations. The dust production rate and color were determined. A normalized gradient of the cometary dust reflectivity in the 3600–7070 Å spectral range amounted to 12.5 %/1000 Å.

Gas and dust activity of comet 67P/Churyumov-Gerasimenko during different appearances will be discussed.