**PHOTOMETRIC VARIABILITY OF THE QUASAR 3C 273**

***Binnatova Z.F , Huseynov N.A***

*Junior researcher, Phd*

Shamakhy Astrophysical Observatory named after N.Tusi, Ministry of Science and Education of the Republic of Azerbaijan

[astrofizikzst@gmail.com](mailto:astrofizikzst@gmail.com), qaramamedlinazim@gmail.com,

Quasar 3C 273 is the brightest quasar in the celestial sphere known so far. In principle, this condition is sufficient for this object to be the subject of intensive research, for this reason, since the discovery of quasars in 1963, this object has been observed in the entire spectral range. In addition, quasar 3C 273 displays most, if not all, of the phenomena that occur in the nuclei of active galaxies (AGNs) [2, p. 399-448].

The name of the object "3C 273" consists of two significant parts. The first part "3C" means that the object belongs to [the Third Cambridge Catalogue of Radio Sources](https://ru.wikipedia.org/wiki/%D0%A2%D1%80%D0%B5%D1%82%D0%B8%D0%B9_%D0%9A%D0%B5%D0%BC%D0%B1%D1%80%D0%B8%D0%B4%D0%B6%D1%81%D0%BA%D0%B8%D0%B9_%D0%BA%D0%B0%D1%82%D0%B0%D0%BB%D0%BE%D0%B3_%D1%80%D0%B0%D0%B4%D0%B8%D0%BE%D0%B8%D1%81%D1%82%D0%BE%D1%87%D0%BD%D0%B8%D0%BA%D0%BE%D0%B2). The second part "273" is a sequence number ordered by [right ascension](https://ru.wikipedia.org/wiki/%D0%9F%D1%80%D1%8F%D0%BC%D0%BE%D0%B5_%D0%B2%D0%BE%D1%81%D1%85%D0%BE%D0%B6%D0%B4%D0%B5%D0%BD%D0%B8%D0%B5) in the Third Cambridge Catalogue [3, pp. 37-60].

Quasars are a class of astronomical objects that are one of the brightest (in absolute terms) in the visible region of the Universe. The English term quasar- is derived from the words quasi-stellar ("quasi-stellar" or "star-like" objects) and radio source and literally means "star-like radio source". Variability in the entire spectral range of quasars is a real mystery. They change their luminosity with an extraordinary frequency, Other active galaxies, such changes in brightness are not observed. The period of change in the brightness of quasars can be calculated in years, weeks, and days. A record is considered to be a 25-fold change in brightness, which is observed in just one hour [4, p. 479-482].

The authors Uchiyama et al. in their work [5, p. 910-921] performed infrared observations of the jet of the quasar 3C 273 at wavelengths of 3.6 and 5.8 microns using the infrared camera (IRAC) on the Spitzer Space Telescope. In combination with radio, optical and X-ray measurements, as well as infrared photometry (IRAC), it is clear that the optical radiation is dominated by the high-energy component of the jet, and not by the radio synchrotron component, as assumed until now.

In [1995,](https://ru.wikipedia.org/wiki/1995_%D0%B3%D0%BE%D0%B4) the [Hubble](https://ru.wikipedia.org/wiki/%D0%9A%D0%BE%D1%81%D0%BC%D0%B8%D1%87%D0%B5%D1%81%D0%BA%D0%B8%D0%B9_%D1%82%D0%B5%D0%BB%D0%B5%D1%81%D0%BA%D0%BE%D0%BF_%D0%A5%D0%B0%D0%B1%D0%B1%D0%BB%D0%B0) Space Telescope obtained optical images of one of the jets around the quasar 3C 273. The linear extent of the jet was ~200 thousand [light years](https://ru.wikipedia.org/wiki/%D0%A1%D0%B2%D0%B5%D1%82%D0%BE%D0%B2%D0%BE%D0%B9_%D0%B3%D0%BE%D0%B4) (~62 Kpc), and the apparent angular size was 23". low emission in the spectrum [5, pp. 910-921]. Equatorial coordinates of the quasar 3C 273: right ascension α2000 = 12 h 29 m 06.7 s, and declination δ2000 = + 02° 03'08". The galactic coordinates of the quasar are l = 289.95 and b = 64.36. The apparent magnitude of the quasar 3C 273 in the V filter (on average) is 12m.9 [6, p. 92-94].

We carried out BVRc and Ic observation of the quasar 3C 273 on the 60 cm telescope of the ShAO named after N. Tusi. Photometric BVRc with Ic observations of the active galaxy 3C 273 were carried out within the period This telescope is a unique instrument for the photometric observations.

The observations were carried out in 2016-2021, in a differential way using close comparison stars. The processing of the obtained photometric data was carried out by the MAXIM DL 4 software package. The resulting material has been calibrated. This purpose, frames have been obtained for the calibration of bias, dark and flat for.

The change in brightness with different amplitudes was detected During the period of photometric observations. The change in brightness is observed synchronously in all filters and the amplitude, the change in brightness from filter B to Ic, as usual, becomes smaller.

Figure 1. The light curve of the quasar 3C 273 in the filter BVRcIc. Filled dashed lines shown that a decrease and increase in the brightness of the quasar 3C 273.

A weakening and increase in the brightness of the quasar 3C 273 has been detected. The change in brightness in the B filter is 0.172, 0.07, 0.257 and 0.09 magnitudes. And in the V filter it was 0.137, 0.121, 0.22, 0.256 stellar magnitudes. In the R filter , the amplitude change in brightness was 0.16, 0.137 and 0.121 stellar magnitudes. We believe that the observed variability of the quasar 3C 273 is related to the change in the environment (density and temperature) around the nucleus and the rate of accretion of matter into the black hole.

References

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