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NuSTAR and XMM-Newton follow-up of the blazar TXS 1515-273

ATel #12565; **Vandad Fallah Ramazani (Tuorla observatory, University of Turku, Finland), Armin Nabizadeh (Tuorla observatory, University of Turku, Finland), Elina Lindfors (FINCA, University of Turku, Finland)**
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Subjects: X-ray, AGN, Blazar

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The blazar TXS 1515-273 (RA=15 18 03.610, Dec= -27 31 31.40, J2000.0) has been showing flaring activity in gamma-rays (>100 MeV), X-ray (0.3-10.0 keV) and NIR bands (ATels #[12532](#), #[12537](#), #[12552](#)). The first time detection of sub-TeV gamma-ray ($E > 100$ GeV) emission from this source was reported by MAGIC telescopes (ATel #[12538](#)). NuSTAR and XMM-Newton performed follow-up observations on this source. We assumed fixed equivalent hydrogen column density of $8.49 \times 10^{20} \text{ cm}^{-2}$ (Kalberla et al., 2005, A&A, 440, 775) in our analysis.

The NuSTAR observations carried out between MJD 58544.59 and 58545.31 with ~34 ks exposure time. The data were reduced by performing the standard data reduction procedure described in the NuSTAR user guide (<https://nustar.ssdsc.asi.it/news.php#>) using the NuSTAR Data Analysis Software `nustardas v1.8.0` with a `caldb` version 20180419 and assuming 75 arc-seconds circle as the source region. Comparing the log parabola model with power-law, power-law with exponential cut-off and broken power-law models, our preliminary analysis shows that the hard X-ray spectrum (4.0-79.0 keV) of the source can be described better by log parabola model ($\chi^2/\text{DOF} = 93.89/79$). The spectral index of the model is 2.26 ± 0.20 and the curvature parameter is 0.21 ± 0.12 . The corresponding flux in range of 4.0 to 79.0 keV is $(7.18 \pm 0.31) \times 10^{-12} \text{ erg/cm}^2/\text{s}$.

The XMM-Newton performed follow-up observations between MJD 58543.95 and 58544.24 with ~19 ks exposure time. The data were analysed using the XMM-Newton Science Analysis System SAS version 17.0.0 with the latest available calibration files. In order to use well-calibrated and cleaned data, the standard filtering expressions were applied to the observation, in which the circular regions of 35 arc-seconds were used to extract the source and background X-ray spectra. Our preliminary analysis shows that the soft X-ray spectrum (0.4-10.0 keV) can be described by log-parabola model ($\chi^2/\text{DOF} = 541/473$). The spectral index of the model is 2.04 ± 0.01 and the curvature parameter is 0.54 ± 0.03 . The corresponding flux in range of 0.4 to 10.0 keV is $(7.99 \pm 0.06) \times 10^{-12} \text{ erg/cm}^2/\text{s}$. The observed flux on MJD 58541.64 over the same energy range was $1.76 \times 10^{-11} \text{ erg/cm}^2/\text{s}$ (Swift-XRT observation). This indicates that the soft X-ray flux is halved in time scale of ~56 h.

We thank the XMM-Newton and NuSTAR science operations teams for fast response and scheduling of our ToO observations.

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