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Neutrino fluence from X-ray flares of blazars frequently observed by Swift

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Blazars are the most extreme subclass of active galactic nuclei with relativistic jets emerging from a supermassive black hole and forming a small angle with respect to our line of sight. Blazars are also known to be flaring sources: they exhibit large flux variations over a wide range in frequency and on multiple timescales, ranging from a few minutes to several months. Blazar flares have been suggested as ideal candidates for enhanced neutrino production. Interestingly, the flaring blazar TXS 0506+056 was the first astrophysical source to be associated with a high-energy neutrino. While neutrino production during gamma-ray flares has been widely discussed, the neutrino yield of X-ray flares has received less attention. Here, we compute the predicted neutrino fluence of X-ray flares detected in blazars observed with *Swift*-XRT more than 50 times. To this end, we applied the Bayesian Block algorithm to the 1 keV XRT light curves of frequently observed blazars to characterize statistically significant variations, at the same time suppressing the inevitable contaminating observational errors. We categorized flares into classes based on their variation from the time-average value of the data points. Using spectral information, we computed for each flare the 1-10 keV fluence. The latter is shown to be a good proxy for the all-flavor neutrino flux in the scenario where X-ray flares are powered by synchrotron radiation of protons intermittently accelerated in the blazar jet. We present preliminary results of our analysis for a few indicative blazars.

Collaboration name

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