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A strategy to unveil transient sources of ultra-high-energy cosmic rays

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The origin of ultra-high-energy (UHE) cosmic rays (CRs) is still unknown and one of the biggest mysteries in modern astrophysics. The uncertainty of their composition makes this problem more complicated. If protons are dominant in UHECRs and are produced by phenomena related to astrophysical jets or outflows, there are few steady source candidates in local Universe which have luminosities enough to accelerate protons up to 10^{20} eV via statistical particle acceleration mechanisms. Since the few steady sources are difficult to reproduce isotropy observed by recent UHECR experiments, promising source candidates are astrophysical transients such as flares of active galactic nuclei and gamma-ray bursts. In this presentation we discuss how evidence of transient sources can be found and how future UHECR experiments can constrain transient source population of UHE protons.

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