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Astrophysics of cosmic ray accelerators

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The Universe is capable of accelerating cosmic rays to energies beyond 10^20 eV. Due to deflection in magnetic fields during their propagation, it is difficult to trace them back to their origin. However, cosmic rays produce gamma-ray photons and neutrinos in interactions with matter and photon fields in or close to the source. Being neutral those secondary particles can travel undeflected and ultimately point back to the source.

Candidate sources include active galactic nuclei (AGN), Starburst Galaxies, Tidal Disruption Events (TDEs) and Gamma-ray Bursts (GRBs). I will put the potential acceleration sites in the context of recent observations of gamma-ray and neutrino emission.

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