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A multi-wavelength view of gamma-ray emitting extreme BL Lacertae blazar candidates hidden within Fermi-LAT data.

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Blazars are key-elements in the understanding of the extragalactic gamma-ray sky. These sources are jetted radio-loud active galactic nuclei dominated by non-thermal emission that extends across the electromagnetic spectrum. Their emission is a proof of cosmic particle acceleration and the production of ultra-relativistic particles within the blazar structure, and are therefore excellent astroparticle physics laboratories. Particularly interesting are extreme high-synchrotron-peak (EHSP) blazars, a subtype of blazar whose gamma-ray emission is expected to peak at TeV energies, yet surprisingly they are a minority in very high energy source catalogs. In this talk, we show a model-driven methodology to search for EHSP blazars based on data from NASA's Fermi Gamma-ray Space Telescope in addition to archival radio, optical, and X-ray data. This method allows us to study their physical properties. Our main results are (1) finding 17 new EHSP blazars, increasing significantly their number, (2) that only 2 of them seem to be detectable by TeV telescopes, and (3) these 2 objects are outliers relative to their magnetic versus kinetic energy density. We discuss some interpretations of these results.

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