

Disentangling Hadronic and Leptonic Cascade Scenarios from the Very-high-energy Gamma-ray Emission of Hard-spectrum Blazars

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The very-high-energy (VHE; > 100 GeV) gamma-ray spectra of extreme high-frequency peaked BL Lac objects and distant hard-spectrum blazars can be well explained either by gamma rays emitted at the source or by cascades induced by ultra-high-energy cosmic rays. The confirmation of the hadronic scenario provides strong evidence for the origin of ultra-high-energy cosmic rays. In this talk, we show that the two scenarios can be distinguished observationally by measuring the gamma-ray flux above ~ 1 TeV (depending on source redshift). Depending source redshift, if the often quoted redshift of KUV 00311-1938 ($z = 0.61$) is believed, the preliminary H.E.S.S. data favor cascades induced by ultra-high-energy cosmic rays. We also discuss the effect of magnetic fields surrounding the blazars in the hadronic cascade scenario.

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