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The ultra-high energy cosmic ray spectrum and Fermi shock acceleration.

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Abstract content

The energy spectrum of ultra-high energy cosmic rays (UHECR) is usually calculated for sources with identical properties. Assuming that all sources can accelerate UHECR protons to the same extremely high maximal energy E_max > 10^{20} eV and have the steeply falling injection spectrum 1/E^{2.7}, one can reproduce the measured cosmic ray flux above E > 10^{18} eV. We show that relaxing the assumption of identical sources and using a power-law distribution of their maximal energy allows one to explain the observed UHECR spectrum with the injection 1/E^2 predicted by Fermi shock acceleration. We study possible ways to distinguish between these two cases with future experiments.

If this papers is presented for a collaboration, please specify the collaboration

Summary

Reference

Proceedings of the 30th International Cosmic Ray Conference; Rogelio Caballero, Juan Carlos D'Olivo, Gustavo Medina-Tanco, Lukas Nellen, Federico A. Sánchez, José F. Valdés-Galicia (eds.); Universidad Nacional Autónoma de México, Mexico City, Mexico, 2008; Vol. 4 (HE part 1), pages 487-490

Primary author(s) : Dr. SEMIKOZ, Dmitri (APC, Paris)

Co-author(s) : Prof. KACHELRIESS, Michael (Norwegian U. Sci. Tech.)

Presenter(s) : Dr. SEMIKOZ, Dmitri (APC, Paris); Prof. KACHELRIESS, Michael (Norwegian U. Sci. Tech.)

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