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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 $E_{\text{max}} > 10^{20}$ 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

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