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Propagation of ultra energetic nuclei: spectral and composition signatures of the transition from galactic to extragalactic cosmic rays

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Abstract content

We discuss the differences induced by the assumed composition of extragalactic sources on the predicted UHECR spectrum. We show that in the case of an extragalactic mixed composition, the cosmic ray spectrum can be reproduced down to the ankle, which is then interpreted as the end of the transition from galactic to extragalactic cosmic rays. The corresponding X_{\max} evolution is presented and compared with the second knee transition models based on the assumption of pure proton extragalactic sources. We show that features associated with the transition from galactic to extragalactic can be predicted in essentially a hadronic model independent way. The comparisons with Stereo HiRes and Fly's Eye data favor an extragalactic mixed composition and the corresponding interpretation of the ankle. Future data will allow a better determination of the transition features and of the injected composition in a hadronic model independent way. We also emphasize that in the pure proton case this kind of combined analysis could exhibit the signature of the evolution with redshift of the UHE sources.

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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 253-256

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