

Indication of a Local Source of Ultra-High-Energy Cosmic Rays in the Northern Hemisphere

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We present the first joint fit of an UHECR source population to Telescope Array (TA) and Pierre Auger Observatory (PAO) data. We simulate the propagation of UHECRs for a wide range of source parameters and fit this to the spectrum and composition observed by both experiments. The systematic differences between the two experiments are taken into account as additional parameters of the fit. To explain the differences between the measurements of TA and PAO above 30 EeV, we include an additional local source in the Northern Hemisphere. The presence of that local source is favored at the 5.6σ level compared to the scenario where both experiments observe the same isotropic UHECR flux. In the best-fit scenario, the local source lies at a distance of 14 Mpc and emits cosmic rays dominated by the silicon mass group. We discuss other possible parameter combinations and possible source candidates by comparing these results with recent TA anisotropy measurements.

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