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Ultra-High Energy Cosmic Ray Origin and Model Building in Light of new data[1]

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Ultra-high energy cosmic ray detection recently made a considerable leap forward due to results of the world's current largest cosmic ray detector, the Pierre Auger Observatory in Argentina, and also due to new data from the Northern hemisphere, such as from the High Resolution Fly's Eye. As often the case when science enters new sensitivity regimes, the emerging picture also holds some surprises. For example, there is a significant correlation of highest energy events with the large scale galaxy structure on the Southern hemisphere but at the same time considerable deflection by cosmic magnetic fields would be expected if many of these events are heavy nuclei, as hinted to by the data. We will discuss how this and other open questions may be addressed by theoretical models for the origin of the most energetic particles in Nature.

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