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The Imprint of Large Scale Structure on the Ultra-High-Energy Cosmic Ray Sky[1] CHEN DING, New York Univ NYU, NOEMIE GLOBUS, ELI beamlines / Flatiron Institute, GLENNYS FARRAR, New York Univ NYU — We show how to use the large- and intermediate-angular-scale anisotropies of ultra-high-energy cosmic rays (UHECRs) observed by the Pierre Auger Observatory to infer the origin and composition of UHECRs. A good accounting of the magnitude, direction and energy dependence of the dipole anisotropy at energies above 8 EeV is obtained, with the postulation that the source distribution follows the matter distribution of the local Universe, and taking into account the impact of energy losses during propagation and deflections in the Galactic magnetic field. The observed dipole anisotropy is incompatible with a pure proton composition in this scenario. We demonstrate the importance of the accuracy of the treatment of energy losses, and we present the improved treatment which unleashes the power of the model in constraining the UHECR composition and properties of the extragalactic and Galactic magnetic fields, and potentially exposing individual UHECR sources in future updates.

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