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Cross-Correlation of UHECRs with the Local Matter Distribution CRAIG LAGE, New York University, PIERRE AUGER COLLABORATION — The cross-correlation of UHECR arrival directions with the local matter distribution is a powerful tool for analyzing the anisotropy of cosmic ray events. Because the nearby matter distribution is known to high resolution from the 2 MASS Redshift Survey, the fractional fluctuations in the cross-correlation are reduced by the factor $\sim (nN)^{-\frac{1}{2}}$, where n is the number of UHECR events and N the number of galaxies, as compared to $\sim n^{-1}$ for UHECR auto-correlations. The observed cross-correlation between UHECRs detected with the Pierre Auger Observatory and 2MRS galaxies is incompatible with the UHECRs coming from an isotropic distribution, and compatible with their sources being associated with galaxies. The dependence of the significance of the correlation on the energy threshold of the UHECRs and on the depth of the galaxy sample carries important information, which can be interpreted by simulations with mock UHECR catalogs.

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