

Abstract Submitted
for the APR12 Meeting of
The American Physical Society

Prospects for Sampling the Cherenkov Lateral Distribution of Air Showers from the Highest Energy Cosmic Rays¹ DONALD DRISCOLL, Kent State University at Ashtabula, CORBIN COVAULT, ROSS BURTON, ANDREW FERGUSON, DANIELLE LAHURD, Case Western Reserve University — The origin and nature of the highest-energy cosmic rays remain a puzzle. A critical concern is the composition of primary cosmic rays at energies above 10^{19} eV, where the GZK cutoff should be important. In principle, Cherenkov light generated in extensive air showers can be used to determine the energy and estimate the atomic composition of the primary cosmic rays. We present a study to explore the prospects of using an array of photon detectors to sample the lateral distribution of Cherenkov light arriving on the ground. By measuring the arrival time and photon density of Cherenkov light, we could provide an independent mechanism for reconstructing air shower parameters. We also consider a preliminary design for such an array with initial performance estimates based on Monte Carlo air-shower simulations.

¹This research is supported in part by a grant from the National Science Foundation.

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Date submitted: 06 Jan 2012

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