

# MEASUREMENT OF THE COSMIC RAY ENERGY SPECTRUM AND COMPOSITION FROM $10^{17}$ TO $10^{18.3}$ EV USING A HYBRID TECHNIQUE

HiRes/MIA Collaboration

We study the spectrum and average mass composition of cosmic rays with primary energies between  $10^{17}$ eV and  $10^{18}$ eV using a hybrid detector consisting of the High Resolution Fly's Eye (HiRes) prototype and the MIA muon array. Measurements have been made of the change in the depth of shower maximum as a function of energy. A complete Monte Carlo simulation of the detector response and comparisons with shower simulations leads to the conclusion that the cosmic ray intensity is changing from a heavier to a lighter composition in this energy range. The spectrum is consistent with earlier Fly's Eye measurements and supports the previously found steepening near  $4 \times 10^{17}$ eV .