Calibration of the CREAM Calorimeter with CERN Beam Tests

The Cosmic Ray Energetics And Mass (CREAM) instrument, operating on the International Space Station (ISS) since August 2017, measures the elemental composition of cosmic rays with energies around the so-called “knee” of the spectrum. The calorimeter (CAL), which measures cosmic ray energy utilizing tungsten absorbers and scintillating fibers, was placed in electron and pion beams at the European Laboratory for Particle Physics (CERN). This data is compared to computer simulations of the CAL, first by matching it to electrons, and checking against pion data later. Constants are calculated to understand the amount of additional smearing needed to match simulations to the data, and to determine the calibration constant used to convert from digital units used in the CAL and energy. The simulations will be used to interpret data collected during CREAM’s expected three years of operation on the ISS.