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The Nuclear Physics of High-Energy Cosmic Rays

SPENCER KLEIN, Lawrence Berkeley National Laboratory & UC Berkeley

High-energy cosmic-ray interactions are the highest energy nuclear interactions on earth, reaching energies far eclipsing the LHC. The incident particles range from protons to iron. They are thus a unique probe of ultra-relativistic ion collisions and also of the incident particles themselves. This talk will introduce the concepts of cosmic-ray interactions and the detectors used to study them, with a special emphasis on the high-energy (TeV) muons produced in the collisions. I will then focus on two topics of special interest to nuclear physicists: perturbative QCD based studies of the cosmic-ray composition and interaction, and studies of forward physics.