Investigating the 2\textsuperscript{nd} Knee: The KASCADE-Grande Experiment

Andreas Haungs\textsuperscript{1} for the KASCADE-Grande-Collaboration

\textsuperscript{1}Institut für Kernphysik, Forschungszentrum Karlsruhe, 76021 Karlsruhe, Germany

KASCADE-Grande is an extensive air shower experiment co-located to the original KASCADE site at Forschungszentrum Karlsruhe, Germany. The multi-detector system allows to investigate energy spectrum, composition, and anisotropies of cosmic rays in the energy range up to 1 EeV. In addition, due to multi-parameter observations of individual air showers the validity of hadronic interaction models can be tested.

Recent results from KASCADE on measurements of cosmic rays in the energy range of the so called knee (at \textasciitilde 3 PeV) indicate a distinct knee in the energy spectra of light primary cosmic rays and an increasing dominance of heavy ones towards higher energies. To improve the reconstruction quality and statistics at higher energies, where the knee of the heavy primaries is expected at around 100 PeV, KASCADE has been extended by a factor 10 in area to the new experiment KASCADE-Grande and has now sensitivity for energies up to 1 EeV including the range of the second knee in the primary energy spectrum, where the transition from galactic to extra-galactic origin of the cosmic rays can occur.

An overview on the performance of the apparatus, shower reconstruction methods, and first results of the Grande set-up as well as an update of the KASCADE data analyses will be given.