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The all-particle cosmic ray energy spectrum measured with HAWC in the TeV region

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The HAWC observatory is an air shower detector well suited for the research of cosmic rays in the energy interval between 10 TeV to 1 PeV , which is very interesting because in this range the data from space-borne detectors and extensive air shower experiments overlap. This fact opens the possibility to perform cross checks between direct and indirect cosmic ray detector techniques and to study the systematic errors that affect each detection technique. In this work, we present an update of the all-particle energy spectrum of cosmic rays between 10 TeV and 1 PeV that was obtained from an unfolding analysis applied on three years of HAWC's data. The shower events were collected from January, 2018 to December, 2020. The results show the presence of a knee-like structure around tens of TeV, which was previously reported by the HAWC collaboration in 2017. For the calibration and the energy estimation, we employed the high-energy hadronic interaction model QGSJET-II-04.

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