THE PRIMARY PROTON SPECTRUM IN THE RANGE $0.5 \div 50$ TEV FROM THE OBSERVATION OF HADRONS AT EAS-TOP

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The primary cosmic ray proton flux in the energy range $0.5 \div 50$ TeV is derived through the analysis of hadron events recorded by the EAS-TOP Hadron Calorimeter (Gran Sasso Laboratory, 2000 m a.s.l.).
The hadron flux at 820 $g\ cm^{-2}$ has been measured in the range $30\ GeV \div 10\ TeV$ and found to be well described by a single power law $S_{had}(E) = (2.25 \pm 0.20)\ 10^{-7} E^{(-2.79 \pm 0.06)}\ m^{-2} s^{-1} sr^{-1} GeV^{-1}$, to which a systematic uncertainty of 15% has to be added.
A Corsika/QGSJET Monte Carlo simulation is used to derive the expected hadron flux and compare it to the experimental result, thus determining the primary proton spectrum parameters. The chosen hadronic interaction model describes well the ratio of hadron fluxes as measured at the two different atmospheric depths of EAS-TOP and KASCADE experiments in the energy range here considered. The heavier nuclei component is subtracted in accordance to expectations from direct measurements. The results on the primary proton spectrum are presented and the procedure of data analysis and accuracy of the measurement are discussed.