

Primary proton and helium spectra at energy range from 50 TeV to 10^{15} eV observed with the new Tibet AS core detector array

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Abstract. A new EAS hybrid experiment has been designed by constructing a YAC (Yangbajing Air shower Core detector array) inside the existing Tibet-III air shower array. The first step of YAC, called “YAC-I” has been successfully carried out in 2009-2010 together with Tibet-III air-shower array. YAC-II has also been operated from 2011. Preliminary results of YAC-I and performance of YAC-II are presented in this paper. The primary proton and helium spectra at energy range from 50 TeV to 10^{15} eV derived from YAC-I data based on QGSJET2 and SIBYLL2.1 are reported. The obtained P+He spectrum is smoothly connected with direct observation data below 100 TeV and also with our previously reported results at higher energies within statistical errors. Based on these results and the sharp knee of all-particle energy spectrum observed by our experiment, the possible origin of the sharp knee is discussed. See the published papers.

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