

On the PCR mass composition around and above the “knee” according to the cluster structure of γ families observed in the PAMIR emulsion chamber experiment

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Abstract. The cluster analysis of simulated γ -families calculated in QGS model revealed a possibility to reconstruct efficiently neutral pions from the last generation of a cosmic-ray origin nuclear cascade, occurring in a thick air target above the X-ray emulsion chamber, as well as the corresponding hadrons from the last but one generation. Simultaneous treating of longitudinal and lateral family characteristics for younger hadrons increases sensitivity to the PCR mass composition while selection of families by the number

of extracted high-energy hadrons (clusters), rather than released energy $\sum E_\gamma$, makes it possible to evaluate energy E_0 of a primary cosmic ray particle within a factor of $\sim 2 \div 3$. In this way, conclusions on the PCR mass composition around and above the knee energy region is derived through comparison of the Pamir Experiment data with simulation results.

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