

A new signature of the coplanar emission of high-energy particles recorded in X-ray emulsion chamber experiments

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Abstract. The results of the further study of a new phenomenon of coplanar particle production, observed in cosmic ray interactions at energies greater than 10 PeV, are presented. To reduce the disturbing effect of subsequent nuclear interactions on the observation of the coplanarity phenomenon at the mountain altitudes, a new technique of analysis is applied which makes it possible to investigate the strong anisotropy of γ -families recorded by the emulsion chambers. It revealed an existence of high fraction of experimental events with abnormally high concentration of the particle energy

within a narrow two-wing space restricted by small vertical angles on the target plot of the event with vertex lying in the center-of-energy of the event. The experimental effect considerably exceeds the statistical fluctuations calculated in the conventional models of nuclear cascade propagation in the atmosphere. The relation of the effect to the alignment of high-energy particles (or clusters) in the coplanar events is discussed.

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