

SEARCH FOR PEV GAMMA RAYS WITH THE KASCADE EXPERIMENT

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EAS registered by the KASCADE experiment were searched for events which might be attributed to primary gamma rays. For this search only the electron detectors of the array and the muon counters in the array and the trigger plane of the central detector were used. The basic procedure consisted of comparing the experimental data with simulated gamma ray showers, including a detailed detector Monte Carlo. The main selection criterium was a low muon to electron ratio. Additional cuts were employed with respect to the steepness ('age') and the smoothness of the lateral distribution. Out of a total of c. 9 million reconstructed showers surviving the usual cuts with respect to core position and zenith angle (< 35 deg.) c. 11000 remain in the range where more than 90 % of the gamma induced simulated showers are found. Their distribution in the $\lg(N_e) - \lg(N_\mu)$ plane clearly shows that the bulk of these events represent the tail of hadron induced EAS. The 35 most 'gamma-like' of these events, selected according their position in this plane, show the same distribution on the sky as the bulk of the data. Hence we do not claim any positive detection. Flux limits are derived in the energy range 0.3 to 10 PeV. These limits confirm and, below 1 PeV, improve the limits set previously by the CASA-MIA and EAS-TOP experiments. In course of the analysis no assumptions on the characteristics of hadronic showers were made. This is of importance since simulations of hadron induced EAS may be subject to considerable systematic uncertainties especially in the tails of the distributions.