Joint DESY and University of Hamburg Accelerator Physics Seminar

Tuesday, April 13-th, 2010

(16:00 in Room 459/30b)

Studying High Energy EGRET Sources by an Array of Water Cherenkov Detectors

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Abstract

A small flat square array of Water Cherenkov Detectors (WCDs) was used to look for electromagnetic air showers that are produced by initial gamma ray photons. The array which consists of 4 WCDs is located at the Physics Department of Sharif University of Technology, Tehran, Iran. We obtained an angular distributions and a galactic map of recorded Extended Air Shower (EAS) events. Applying the Li-Ma method, we found a few prominent points on the galactic map and compared their location with the locations of Energetic Gamma Ray Experiment Telescope (EGRET) sources. A few of those prominences had distinguishable statistical significances. To check the acquired results, we divided our data into 4 parts and repeated all previous steps. But this time we found different sources with important statistical significance. It means that the eminent sources we obtained as our results are in the order of statistical fluctuations, in other words, with this amount of data and the poor angular resolution of our detectors we cannot observe any gamma ray source. Then, in the next step we planned to find rare or non-random gamma ray events belonging to special windows of time, naturally located in the tails of distributions of our mean count rate (counts in subintervals of time or time-windows) which are expected to be Poisson distributions, since we are detecting EASs as almost random events. Among the provided data, 17 events were very likey to be gamma ray events. The 12 most probable candidates are accumulated in a circle region around $(l, b) = (-25^\circ \pm 20^\circ, 100^\circ \pm 25^\circ)$ so that it is plausible that they can be identified as events are from certain EGRET sources.

J.Roßbach (Univ. HH) and M.Vogt (MPY).