Contribution ID : **526**   Type : **Plenary/section talk**

New method of high-energy gamma ray direction reconstruction in multilayered converters

Tuesday, 23 October 2018 18:05 (15)

A new method of high-energy gamma ray incident direction reconstruction is developed for gamma-ray detectors with multilayered converters. The method uses data from converter and, if available, from position-sensitive calorimeter to reconstruct an electromagnetic cascade axis and to determine the incident direction of a primary gamma. For the first time to find point of intersection of gamma direction line with a convertor plane, the median of energy deposit in sensitive plane of a convertor is used. Applied, for example, to space gamma-telescope "GAMMA-400" this method allowed to achieve the angular resolution ˜ 0.01° at gamma-ray energy of 100 GeV, being much better than accuracy of the past and present space- and ground-based experiments. In the algorithm presented, a trade-off between the angular resolution and the effective area can be found to meet scientific goal of an experiment.

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Session Classification : Facilities and Advanced Detector Technologies

Track Classification : Facilities and advanced detector technologies