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Gamma-ray identification with Sb

Gamma-ray observatories must efficiently distinguish gamma-ray-induced showers from the abundant background of hadronic showers. The shape of the lateral signal distribution offers crucial information for this task. Sb is a key observable that characterizes the shape of the lateral signal distribution. It is computed using the signal and position of each triggered detector, along with a free parameter, b. This work investigates the potential of Sb as a robust discriminator for gamma-ray identification in triangular grid arrays with varying detector densities. The behavior of the free parameter b was studied as a function of both the zenith angle and the shower size. A parametrization of b is provided for use in Sb on an event-by-event basis. This parametrization yields improvements in both merit and quality factors for gamma-ray observatories such as SWGO.

Collaboration(s)

SWGO collaboration

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