

Hadron-gamma discrimination from an orbital UHECR observatory

Abstract content

The identification of very high energy photons is of great importance for the understanding of the origin of ultra high energy cosmic rays. Several can be the sources of high energy photons at Earth. A guaranteed component is the flux of high energy photons expected as a consequence of the interaction of cosmic rays with the cosmic photon background. Another contribution may be expected as by-products at the acceleration sites of protons and nuclei, although such flux should be strongly suppressed for distant sources. Top-down scenarios, on the other hand, involving the decay of super heavy relic particles or topological defects, even if not currently favored, have as a characteristic signature an increasingly dominant flux of photons at the highest energies. In this work we study the statistical separation between hadron and photon showers at energies where both, LPM effect and magnetospheric interactions are important for the development of the cascades. We consider a detector with different orbital characteristics, but disregard trigger and reconstruction efficiencies, in order to define the maximum ideal discrimination power attainable.

Primary author(s) : Dr. SUPANITSKY, Daniel (Dep. Altas Energias, Inst. de Ciencias Nucleares, Universidad Nacional Autonoma de Mexico, Mexico DF, CP 04510)

Co-author(s) : MEDINA-TANCO, Gustavo (Dep. Altas Energias, Inst. de Ciencias Nucleares, Universidad Nacional Autonoma de Mexico, Mexico DF, CP 04510)

Presenter(s) : Dr. SUPANITSKY, Daniel (Dep. Altas Energias, Inst. de Ciencias Nucleares, Universidad Nacional Autonoma de Mexico, Mexico DF, CP 04510)