

Event rates of UHE photons cascading in the geomagnetic field at CTA-North

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Executive Summary

In this work, we propose to point gamma-ray telescopes just above the horizon to search for ultra-high energy (UHE - EeV and beyond) photons cascading in the geomagnetic field. Such a strategy allows gamma-ray telescopes to join the ongoing searches performed by the Pierre Auger Observatory and Telescope Array for these yet-unobserved photons, and to test supermassive particle and GZK models. For this purpose, we performed extensive air shower simulations to investigate the UHE photon/cosmic-ray background separation in the nearly-horizontal direction, and attempted to estimate the number of events expected for different emission scenarios. We showed that background-free observation could be performed with high signal efficiency, and that in the case of gamma-ray bursts, we could expect up to 0.17 events in 30 hours of observation.