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Recent Developments Towards All-sky Surveys and Selected Results from Ground-based Gamma-ray Astrophysics

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In this report we would like to discuss recent developments in ground-based gamma-ray astrophysics. Since the 1990s, very high energy gamma rays have been studied with the Imaging Atmospheric Cherenkov Telescopes (IACT), which measure the Cherenkov light component of air showers. These have high sensitivity in a field of view of several degrees and can provide angular resolution on the order of 0.05°-0.1°, but can only measure during clear, dark nights, for a total of about 1000 hours per year. Typically, a single source can be observed with an IACT for about 200 hours per year. Ground-based detectors such as HAWC, TIBET and LHAASO perform source observations by measuring elementary particles from air showers. These highaltitude detectors measure sources in their 1-2 srad wide field of view for about 6 hours per day, a total of about 2000 hours per year. Their angular resolution is 5-6 times worse compared to the IACT technique. The sensitivity of both techniques is similar, scaling linearly with the signal detection area and the background rejection efficiency. We plan to discuss some selected source detections using these different techniques and outline the prospects for the future developments that will be based on the combination of both techniques.

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