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In-situ Measurements of the Reflectivity of VERITAS Telescopes

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VERITAS is an array of four imaging atmospheric Cherenkov telescopes (IACT) sensitive to gamma rays at energies between 100 GeV and 10 TeV. Each telescope is based on a tessellated mirror, 12 metres in diameter, which reflects light from a gamma-ray-induced air shower to form an image on a pixellated 'camera' comprising 499 photomultiplier tubes. The image brightness is the primary measure of the gamma ray energy so a knowledge of the mirror reflectivity is important. We describe here a method, pioneered by members of the MAGIC collaboration, to measure the whole-dish reflectivity, quickly and regularly, so that effects of aging can be monitored. A CCD camera attached near the centre of the dish simultaneously acquires an image of both a target star and its reflection on a target of Spectralon, a highly reflective material, placed at the focus of the telescope. The ratio of the brightnesses of the reflected and direct images of the star, as recorded by the CCD, along with geometric factors, provides an estimate of the dish reflectivity with few systematic errors. Since the mirrors reflect different wavelengths, a filter wheel is placed in front of the CCD camera, allowing a measurement of the reflectivity as a function of wavelength. We present results obtained with the VERITAS telescopes during the past year.

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