

ALIGNMENT OF THE MIRROR FACETS OF THE H.E.S.S. CHERENKOV TELESCOPES

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The H.E.S.S. project is one of the next generation instruments for VHE gamma-ray astronomy. In its first phase a stereoscopic system of four Imaging Atmospheric Cherenkov Telescopes (IACTs) with a mirror area of about 100 m² will be build in the Komhas Highlands of Namibia. Each reflector will consist of 380 individual mirror tiles. These are quartz-coated aluminized mirrors with 60 cm diameter and a reflectivity higher than 80% in the range between 300 nm and 600 nm. The diameter of the focus spot, which is defined as a circle containing 80% of the light intensity, must be less than 1 mrad, which corresponds to a rms spot width of 0.28 mrad. The required adjustment accuracy is 0.1 mrad, one tenth the spot size. This includes all possible errors resulting from the mirror support and the mechanics of the positioning system. The mirrors supports are equipped with DC motors. They provide together with the feedback of a CCD camera an automatic alignment system, which uses images of stars reflected onto the telescope camera lid to monitor the position of the mirrors.

The stability of the mirror support and the positioning accuracy has been thoroughly tested. These tests include tests of the complete adjustment procedure with CCD camera and electronics for mirror control.

The details of the mirror support system, of the electronics and the adjustment procedure are presented together with description of test procedures and results. In the test the overall positioning accuracy was found to be 0.05 mrad.