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Correcting MAGIC Telescope data taken under non-optimal atmospheric conditions with an elastic LIDAR.

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The Major Atmospheric Gamma-ray Imaging Cherenkov (MAGIC) telescopes are a system of two Imaging Atmospheric Cherenkov Telescopes (IACTs). IACTs make calorimetric use of the Earth's atmosphere, which allows them to reach large effective areas, but also makes them strongly dependent on the quality of the atmosphere at the time of the observations. Dust intrusions or clouds obscuring the observed Cherenkov light can then lead to a wrong reconstruction of the gamma-ray data. In order to mitigate this problem, the MPP group built and has been operating a single wavelength elastic LIDAR (Light Detection And Ranging) system to perform real time ranged-resolved measurements of the aerosol transmission. This information is then used to quantify the quality of the telescope data, as well as to correct the data taken under suboptimal aerosol conditions. In this talk, the correction of atmospherically impaired IACT data will be described and the first systematic evaluation of the correction capabilities of the LIDAR system will be presented. The results describe the impact of the LIDAR corrections for a variety of atmospheric and observational conditions, and therefore contribute to a better understanding of the telescope's performance and related systematic uncertainties.

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