

## CALIBRATION OF THE AUGER FLUORESCENCE TELESCOPES

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Thirty fluorescence telescopes in four stations will overlook the detector array of the southern hemisphere experiment of the Pierre Auger project. The main aim of these telescopes is tracking of EHE air showers, measurement of the longitudinal shower development ( $X_{max}$ ) and determination of the absolute energy of EHE events. Each telescope camera contains 440 PMTs – each covering a  $1.5 \times 1.5$  degree pixel of the sky. The response of every pixel is converted into the number of charged particles at the observed part of the shower. This reconstruction includes the shower/observer geometry and the details of the atmospheric photon production and transport. The remaining experimental task is to convert the FADC counts of the camera pixel electronics into the light flux entering the Schmidt aperture. Three types of calibrations are necessary: a) Monitoring of time-dependent variations has to be performed for all parts of the optics and for all pixels frequently. Common illumination for all pixels of a camera allows the detection of individual deviations. Properties of windows, filters and mirrors have to be measured separately. b) Differences in pixel-to-pixel efficiency are mainly due to PMT gain and to differences in effective area (camera shadow, mirror size limits). Homogeneous and isotropic illumination of the aperture will enable cross calibration. c) An absolute calibration has to be performed once in a while using trusted light monitors. The calibration methods used for the Pierre Auger FD telescopes in Argentina are discussed.