

New developments in aerosol measurements using stellar photometry

Tuesday, 25 September 2018 15:30 (22 minutes)

The idea of using stellar photometry for atmospheric monitoring for optical experiments in high-energy astrophysics is seemingly straightforward, but reaching high precision of the order of 0.01 in the determination of the vertical aerosol optical depth (VAOD) has proven consistently difficult. Wide-field photometry in a large span of altitudes allows fast determination of VAOD independently of the absolute calibration of the system, while providing this calibration as a useful by-product. Using several years of data taken by the FRAM telescope at the Pierre Auger Observatory in Argentina and about a year of data taken by a similar instrument deployed at the planned site of the Cherenkov Telescope Array in Chile, we have developed calibration and analysis methods to improve the precision of this measurement technique towards and possibly beyond the 0.01 mark. Detailed laboratory measurements of the response of the whole system to both the spectrum and intensity of incoming light have proven indispensable in this analysis as the usual assumption of linearity of the CCD detectors is not sufficiently valid for the conditions of the observations.

Primary author: Dr EBR, Jan (Institute of Physics, Prague)

Presenter: Dr EBR, Jan (Institute of Physics, Prague)

Session Classification: analysis techniques and instruments