

# Analysis of atmospheric attenuation using the Telescope Array central laser data

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Located in the western desert of the state of Utah, the Telescope Array (TA) experiment measures the properties of ultra high energy cosmic ray (UHECR) induced extensive air showers. TA employs a hybrid detector comprised of a large surface array of scintillator detectors overlooked by three fluorescence telescopes stations. The TA Low Energy extension (TALE) detector has operated as a monocular Cherenkov/fluorescence detector for nearly five years, and has recently been complemented by a closely spaced surface array to operate in hybrid mode. The TAx4 upgrade is underway and aims to, as the name suggests, quadruple the size of the surface array to improve statistics at the highest energies (post-GZK events).

The analysis of the TA fluorescence detectors (FD) data requires knowledge of the degree of the atmospheric attenuation of UV light produced by shower particles. This attenuation depends partially on the amount of aerosols present in the atmosphere at the time of shower observation. Being highly variable, real time measurement of the aerosols light attenuation is accomplished through the use of a central laser facility (CLF) located at the center of the surface array, and in the field of view of the three FDs, as well as, the TALE FD.

In this talk we will describe the experiment and its various upgrades, the CLF station, and the CLF data and analysis. We will briefly describe other atmospheric monitoring systems used by TA. Finally we will present plans for TAx4 atmospheric calibration.

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