

Auger@TA: Deploying an independent Pierre Auger Observatory SD array at the Telescope Array Project

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The Pierre Auger Observatory and the Telescope Array (TA) are the two largest ultra-high-energy cosmic ray observatories in the world. They operate in the Southern and Northern hemispheres, respectively, at similar latitudes, but with different surface detector (SD) designs. This difference in detector design changes their sensitivity to the various components of extensive air showers. The over-arching goal of the Auger@TA working group is to cross-calibrate the SD arrays of the two observatories in order to identify or rule out systematic causes for the apparent differences in the flux measured at Auger and TA.

The project itself is divided into two phases. Phase-I finished in 2020, and consisted of a station-level comparison facilitated by the deployment of two Auger stations, one prototype station with a single central PMT and a standard Auger station, in the middle of the TA SD near the Central Laser Facility along with a modified TA station to provide external triggers from the TA SD. This provided the opportunity to observe the same extensive air showers with both Auger and TA detectors to directly compare their measurements. Results from the analysis of Auger@TA phase-I data will be shown. Phase-II of Auger@TA is currently underway, and aims at building a self-triggering micro-Augur-array inside the TA array. This micro-array will consist of eight Auger stations, seven of which use the prototype configuration and form a single hexagon with a traditional 1.5 km Auger spacing. The 8th station is of the standard Auger configuration and is placed at the center of the hexagon, along with a TA station to form a triplet. Each Auger station will also be outfitted with an AugerPrime Surface Scintillator Detector. A custom made communication system using readily available components will be used to provide access to the stations directly via the internet. The deployment of the micro-array via helicopter skycrane is currently scheduled for the end of September 2022 and will also be reported on in this talk. A simulation study was carried out to gauge the expected performance of the Auger@TA micro-array; trigger efficiencies and event rates derived from this study will be reported.

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