

# Auger at the Telescope Array: Recent Progress Toward a Direct Cross-Calibration of Surface-Detector Stations

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Since 2007 the Telescope Array Project (TA) and the Pierre Auger Observatory (Auger) have collected extensive data sets spanning several orders of magnitude in energy of the cosmic-ray spectrum. In both experiments the bulk of data is generated from the surface-detector (SD) array, which is energetically calibrated with fluorescence detectors using a hybrid approach. However, each experiment has implemented a different SD station design, resulting in different sensitivities of extensive air-shower channels. Understanding these differences and any potential unforeseen systematic errors is essential for future joint analyses. In this paper we present an update on the progress of an in-situ cross-calibration program. We focus on recent hardware installations which enable the read out of co-located Auger and TA SD stations at the TA central laser facility (CLF). We also present a preliminary analysis of event signals observed at the CLF.

**KEYWORDS:** (cross) calibration, data acquisition, instrumentation

## 1. Introduction

### 1.1 Participants

The Pierre Auger Observatory is a hybrid cosmic-ray (CR) observatory located in Mendoza province, Argentina, which detects extensive air showers using four fluorescence-telescope detectors (FD) and 1660 surface-detector (SD) stations. The Observatory began formal data collection in 2004. Fluorescence observations provide high-quality data of shower energy as well as depth of maximum shower development, but have a limited duty cycle. A subset of hybrid events passing stringent quality cuts is used to calibrate “SD only” events which represent most of the experiment’s data. The