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**Fluorescence Detection of Cosmic Ray Air Showers between $10^{16.5}$ eV and $10^{19}$ eV with the Telescope Array Low Energy Extension (TALE)**[1]

J.N. MATTHEWS, Z. ZUNDEL, C.C.H. JUI, J.D. SMITH, S.B. THOMAS, D. IVANOV, University of Utah - Dept of Physics & High Energy Astrophysics Inst, TELESCOPE ARRAY PROJECT COLLABORATION — The Telescope Array Experiment has been observing cosmic ray air showers at energies above $10^{18}$ eV since 2008. TA operates three Fluorescence Detector (FD) sites, with telescopes that observe 3-31 deg in elevation. The FD sites are located at the periphery of a surface array of 507 scintillation counters covering 700 km$^2$, with 1.2km spacing. The TA Collaboration is in the process of building a low-energy extension at its Middle drum FD site. Ten new telescopes will observe between 33 and 51 degrees in elevation. A graded ground array of between 400 and 600m will be placed in front of the TALE FD. We have already observed multi-telescope cosmic ray events as well as the scattered light from the central laser (CLF). By 4/2013, all ten telescopes will have been commissioned and the first 35 scintillator counters will have been deployment by helicopter. With these upgrades, the physics threshold of TA will be lowered to $10^{16.5}$ eV. The TA Low Energy Extension (TALE) will explore the energy regime corresponding to that of the LHC in center-of-mass frame. This is also the range where the transition from galactic to extra- galactic cosmic ray flux is suspected to occur. We will give a brief overview of the physics, and report on the progress of TALE.

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