Research Report
ICRR Inter-University Research Program 2019

Research Subject:

Study of UHECR origin using the TAx4 Fluorescence Detectors

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Summary of Research Result :

To search for the origin of ultra-high energy cosmic rays, continuous operation of the Telescope Array experiment and TALE experiment, their data analyses and commissioning of the new extended array, TAx4, were performed.

In the end of FY2018, 257 new SDs were installed in the north and south to the original TA array. After tuning and optimization works in the field, since November 2019, the new array has started a stable data acquisition. Including the original TA array now a 2.5 times larger array is in operation. A dedicated FD for the new array has been in operation at the Middle Drum site since 2018. Another new FD at the Black Rock site was installed and started operation in November 2019. Air shower events commonly and independently recorded by the SD array and the new FDs called hybrid events are already identified. This assures correct event triggering, time stamps, and reconstruction procedures. In the next step, hybrid events will be used to calibrate energy scale and to reconstruct the shower geometry precisely. For precise determination of the absolute gain of the FD cameras, PMTs for calibration are purchased to test using the CRAYS calibration system at ICRR.

New analysis results of TA and TALE are reported in the journals and at ICRC. Highlights are listed in the references.

References

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5. W. Hanlon et al., “Telescope Array 10 Year Composition”, PoS(ICRC2019)280 (2020).
6. R.U. Abbasi et al., “Constraints on the diffuse photon flux with energies above 1018 eV using the surface detector of the Telescope Array experiment”, Astrop. Phys. 110 (2019) 8.
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10. S. Ogio et al., “Telescope Array Low-energy Extension (TALE) hybrid”, PoS(ICRC2019)375 (2020).

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