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Telescope Array Extension

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The Telescope Array (TA) has an array of surface detectors (SD) 700 km^2 in area and three fluorescence telescope stations (FD) to explore the origin of ultra-high-energy cosmic rays.

We found evidence for the hotspot of arrival directions of the highest-energy cosmic rays above $5.7 \times 10^{19} \text{ eV}$, of which size is about 20 degrees in radius. To confirm what the origin of the hotspot is, we proposed to quadruple the TA. This proposal is called TAX4.

From $10^{15.6} \text{ eV}$ to 10^{18} eV , we expect the transition from galactic cosmic rays to extra-galactic cosmic rays. We constructed the TALE (TA Low-Energy extension) FD fully and the TALE SD partially. Since we found two breaks at $10^{16.3} \text{ eV}$ and $10^{17.3} \text{ eV}$ with the TALE FD, we proposed to construct remaining TALE SD to improve the resolution of the shower maximum depth measured with the TALE FD for composition identification. This proposal is called the TALE SD.

In the spring of this year, both TAX4 SD and TALE SD were approved by a Japanese funding agency. Here we present the status of these projects.

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