

Fluorescence detector Array of Single-pixel Telescopes (FAST) project

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We present a concept for large-area, low-cost detection of ultra-high energy cosmic rays (UHECRs) with a Fluorescence detector Array of Single-pixel Telescopes (FAST), addressing the requirements for the next generation of UHECR experiments. In the FAST design, a large field of view is covered by a few pixels at the focal plane of a mirror or Fresnel lens. We report first results of a FAST prototype installed at the Telescope Array site, consisting of a single 200 mm photomultiplier tube (PMT) at the focal plane of a 1 m^2 Fresnel lens system taken from the prototype of the JEM-EUSO experiment. The FAST prototype took data for 19 nights, demonstrating remarkable operational stability. We detected laser shots at distances of several kilometres as well as 16 highly significant UHECR shower candidates. Moreover, we show a full-scale FAST prototype under construction which consists of a 2×2 PMT camera and a segmented spherical mirror of 1.6 m diameter.

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