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High-mountain hybrid installation for multicomponent detection of air-showers induced by ultra-high energy cosmic rays

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Measuring the fluxes of ultra-high energy cosmic rays is a unique tool for studying and testing physics beyond the standard cosmological and elementary particle interaction models. The observation of their fluxes above PeV is of particular interest, since the detection of extensive air-showers produced by these particles allows testing the energy range that is beyond the reach of modern colliders.
It is proposed to deploy a new setup consisting of several high-frequency antennas and combine it with the existing Horizon-T setup into a single complex, which allows simultaneous studies of the phenomena of charged particles delayed from the air-shower front.
The modernized hybrid installation will detect the charged particles and radio emission from air-showers, which allows us to probe in high-resolution space and time distributions in the air-shower cores arriving at the installation at zenith angles up to 85°. This will make it possible to search for exotic particles and new processes beyond standard model that arise during the propagation of cosmic rays through the Earth's atmosphere.
In this work we present our plans on the development and deployment of a new hybrid installation and the details of the technical implementation of new detectors.

Keywords

cosmic rays; extensive air showers; exotic particles; antenna;

Collaboration

other Collaboration

Subcategory

Experimental Methods & Instrumentation

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