

## The Yakutsk EAS Array: Advancing Cosmic Ray Research Through Modernization and Future Development

The Yakutsk EAS Array, one of the world's longest-running cosmic ray observatories, has undergone major modernization (2019–2021) to enhance its detection capabilities. Currently operating an upgraded hybrid system of scintillation and muon detectors, it provides precise measurements of extensive air showers in the  $10^{16}$ – $10^{20}$  eV range. Recent results include mass composition studies and anisotropy analyses of ultra-high-energy cosmic rays. Future development focuses on increasing the muon detector number, improving composition sensitivity, and participating in multi-messenger astrophysics. The array's unique capabilities continue to contribute to understanding cosmic ray origins and testing fundamental physics at extreme energies.

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**Session Classification:** Cosmic rays (nuclei, gammas, neutrinos) of very high energies (> 100 TeV)

**Track Classification:** Cosmic rays (nuclei, gammas, neutrinos) of very high energies (> 100 TeV)