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## Cosmic Rays of Extreme Energies

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After a century of observations, the origin of cosmic rays is still a mystery. At the highest energies, sources should be among the most powerful extragalactic sources and primaries should point back to their sources. Extremely energetic cosmic rays (EECRs) reach interaction energies orders of magnitude beyond the LHC and probe the frontiers of particle physics. Possible explanations for their origin have narrowed down with the confirmation of a GZK-like spectral feature. Hints of anisotropies in the distribution of arrival directions raise hopes for observing source images, however, composition measurements reported by Auger suggest a surprising interpretation. A clear resolution of this mystery calls for much larger statistics at extremely high energies than the reach of current observatories. An additional five orders of magnitude in exposure can be achieved in a future space program. The first step is the JEM-EUSO observatory (Extreme Universe Space Observatory at the Japanese Experiment Module) which is a fluorescence telescope at the International Space Station that can increase the exposure to EECRs by one order of magnitude over the next decade

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