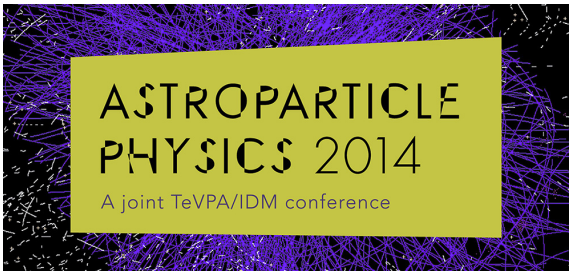

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JEM-EUSO and the future of the UHECR field

Thursday, June 26, 2014 5:35 PM (25 minutes)

Thanks to giant extensive air-showers observatories, such as the Pierre Auger Observatory and the Telescope Array, we now know that the sources of ultrahigh energy cosmic rays (UHECRs) are extragalactic. We also know that either they interact with the CMB as predicted or they run out of energy at the same energy scale of the CMB interactions! Their composition is either surprising (dominated by heavier nuclei at the highest energies) or the hadronic interactions at 100 TeV are not a standard extrapolation of LHC interaction energies. Hints of anisotropies, including a hotspot in the TA sky, begin to appear as energies reach 60 EeV, just when statistics become very limited.
Basic questions remain unanswered: What generates such extremely energetic particles that reach above 10^20 eV (100 EeV)? Where do they come from? How do they reach these energies? What are they? How do they interact on their way to Earth and with the Earth's atmosphere?
To answer these questions larger statistics at the highest energies is necessary. Space-based observatories can significantly improve the exposure to these extremely energetic particles. The first step to answer these questions is to place a wide field UV telescope at the International State Station to monitor the Earth's atmosphere from above. This is the goal of the JEM-EUSO mission: the Extreme Universe Space Observatory (EUSO) at the Japanese Experiment Module (JEM).

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