



Contribution ID : 1308

Type : Oral

The search for UHECR and Neutrinos from Space: a "Vision" for the next decade

Tuesday, 10 July 2007 11:30 (0:12)

Abstract content

Ultra High Energy Cosmic Rays and Neutrinos, with energies from a few 10^{18} eV to beyond the decade of 10^{20} eV, and Cosmic Rays with $E \geq 5 \cdot 10^{19}$ eV appear to be the only suitable messengers to explore the Universe at frontier energies, where radiation is expected to be produced under the most extreme physical conditions. Observations of these UHE particles will certainly provide new information 1) on the sources; and 2) on the physical mechanisms able to accelerate these extreme messengers to macroscopic energies. Moreover, UHE particles may also, provide evidence of yet unknown physics or of exotic particles, relics of the early Universe. To reach these goals, innovative experiments with larger effective aperture ($A_{\text{eff}} \geq 10^5 \text{ km}^2 \text{ sr}$) and good understanding of systematic uncertainties (less than $\sim 10\%$) must be developed. Space-based observatories can reach the effective area necessary to systematically explore the UHE Universe. In the present paper 1.) we present the Science Rationale behind UHE studies from space; 2.) we briefly discuss the science goals, the requirements, the instrument and mission profile of a 'next-generation' space-based mission for UHE observations to be designed and developed in the framework of the ESA "Cosmic Vision 2015-2025" long term plan.

If this papers is presented for a collaboration, please specify the collaboration

Cosmic Vision Collaboration

Summary

Reference

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Session Classification : HE 1.5

Track Classification : HE.1.5