

LABORATORI NAZIONALI DEL GRAN SASSO

SEMINAR ANNOUNCEMENT

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**Status and perspectives in the
detection of ultra-high energy
cosmic rays with the Pierre
Auger Observatory**

High energy cosmic rays provide crucial information on many fundamental processes taking place in the Universe and on the physical laws which regulate them. The sources and mechanisms of production and acceleration of such energetic particles are not yet known as well as their composition and origin in the Universe, therefore a lot of effort has been devoted to detect these particles. The Pierre Auger Observatory is the greatest cosmic ray experiment ever realized up to now. It is located in Malargüe (Argentina) and it is taking data since 2004. The cosmic ray particles are measured by two independent detectors: a surface array made of water Cherenkov detectors and covering an area of 3000 Km² and a fluorescence detector consisting of four fluorescence telescopes overlooking the surface detector area. The hybrid detection of the Pierre Auger Observatory, i.e. the simultaneous measurement of the cosmic ray characteristics by both detectors, provides an optimal control of the systematics and a better reconstruction of the events. In this talk I will give an overview of the present detection techniques and their possible future upgrade. I will also discuss the most important results already obtained on the measurement of the main cosmic ray characteristics as the energy spectrum, the mass composition and the anisotropy in their arrival directions.

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