

Perspective of a Glass Resistive Plate Chambers for Cosmic Ray Muons Detection, in Saudi Arabia

Wednesday, 11 September 2013 19:30 (2h 30m)

Cosmic muons are elementary particles that are classified as leptons. It is a charge with a mass of $105.7 \text{ MeV}/c^2$. They are unstable particles with a lifetime of 2.2 ms. Around 10,000 muons per square meter hit the earth's surface each minute, traveling tens of meters with a velocity close to the speed of light and interacting weakly with matter.

The NCMP (National Center of Mathematics and Physics) had been and still is active in the studying of cosmic rays with two detectors such as GEM (Gas Electron Multiplier), and NaI (the Sodium Iodide), which are under development. These detectors are devoted to measure the intensity of muons. We therefore were incited to develop a detector setup of Resistive Plate Chamber telescope to extend beyond this purpose in providing i.e tracking of the muon particles.

This project is considered to be the pioneer experiment in Saudi Arabia providing a measurement of the rate of cosmic muons at different altitudes from the sea level. This detector is intended to provide for the first time in Saudi Arabia a record of this data.

The detector is made out of four telescopic detectors each consisting of ten Glass Resistive Plate Chambers (GRPC) and each GRPC has a surface of $50 \times 50 \text{ cm}^2$. We also plan to install 5 cm of magnetized iron slabs providing a magnetic field of 1 Tesla. Between the iron slabs a GRPC detector will be installed two induction planes. So each RPC provides the measurement x, y, z of the particle track. Thanks to the magnetic field we aim at measuring the charges of the muons in the range 0.5-2 GeV.

This project will take place in the National Center of Mathematics and Physics (NCMP), at King Abdulaziz city for science and technology (KACST) which is considered one of the active centers amongst the many in KACST, in Riyadh, in Saudi Arabia. In the present contribution we report on an overview on the structure and design of the detector and the importance of this study in Saudi Arabia.

1

Primary author: Dr BADHREES, Ibtesam (Research Assistant Professor)

Presenter: Dr BADHREES, Ibtesam (Research Assistant Professor)

Session Classification: Poster Session

Track Classification: High-Energy Astrophysics (includes all cosmic ray physics)