

μ PPET: studying the Cosmic Rays Muon Puzzle by probing muons with J-PETs

Monday, 13 January 2025 13:00 (1 hour)

The μ PPET [mu(μ)on Probe with j-PET] project aims to investigate the “muon puzzle” from cosmic rays air showers. This puzzle is related to observing a much larger number of muons on the earth’s surface than it results from current theoretical models. The investigated hypothesis relies on an observed effect in muon cross-section and trajectory due to projectile-target polarizations. The measurements require detailed information on muons at the ground, such as track and charge distributions. To measure them, the two PET machines developed at the Jagiellonian University in Poland (J PETs) are used due to their well-known resolution and advantageous location for detecting muons that reach long depths in the atmosphere. One is utilized as a muon tracker, and the second will be converted to an array for reconstructing the core of the atmospheric shower. In parallel, the existing hadronic interaction models will be modified to compare with the measurements and fine-tune them. In this seminar, we will introduce the Muon Puzzle problem, the hypothesis to fix it, and how μ PPET will test it.

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