



SPEAKER: MERMOD, P. (Universite de Geneve (CH))

TITLE: **Search for magnetic monopoles with the MoEDAL prototype trapping detector in 8 TeV proton-proton collisions at the LHC**

DATE: Tue 12/07/2016 11:00

PLACE: 40-S2-A01 - Salle Anderson

ABSTRACT

The MoEDAL experiment is designed to search for magnetic monopoles and other highly-ionising particles produced in high-energy collisions at the LHC. The largely passive MoEDAL detector, deployed at Interaction Point 8 on the LHC ring, relies on two dedicated direct detection techniques. The first technique is based on stacks of nuclear-track detectors with surface area $\approx 18 \text{ m}^2$, sensitive to particle ionisation exceeding a high threshold. These detectors are analysed offline by optical scanning microscopes. The second technique is based on the trapping of charged particles in an array of roughly 800 kg of aluminium samples. These samples are monitored offline for the presence of trapped magnetic charge at a remote superconducting magnetometer facility. We present here the results of a search for magnetic monopoles using a 160 kg prototype MoEDAL trapping detector exposed to 8 TeV proton-proton collisions at the LHC, for an integrated luminosity of 0.75 fb^{-1} . No magnetic charge exceeding $0.5g_D$ (where g_D is the Dirac magnetic charge) is measured in any of the exposed samples, allowing limits to be placed on monopole production in the mass range $100 \text{ GeV} \leq m \leq 3500 \text{ GeV}$. Model-independent cross-section limits are presented in fiducial regions of monopole energy and direction for $1g_D \leq |g| \leq 6g_D$, and model-dependent cross-section limits are obtained for Drell-Yan pair production of spin-1/2 and spin-0 monopoles for $1g_D \leq |g| \leq 4g_D$. Under the assumption of Drell-Yan cross sections, mass limits are derived for $|g|=2g_D$ and $|g|=3g_D$ for the first time at the LHC, surpassing the results from previous collider experiments.