



LHC Seminar

SPEAKER: Francesco Noferini (Enrico Fermi Centre, INFN Bologna, INFN CNAF)

TITLE: **Precision measurement of the mass difference between light nuclei and anti-nuclei with ALICE at the LHC**

DATE: Tue 14/07/2015 11:00

PLACE: Council Chamber

ABSTRACT

In ultrarelativistic heavy-ion collisions a large and equal amount of nuclei and anti-nuclei is produced in the central pseudorapidity region allowing for a precise investigation of their properties. Mass and binding energy are expected to be the same in nuclei and anti-nuclei as long as the CPT invariance holds for the nuclear force, a remnant of the underlying strong interaction between quarks and gluons. The measurements of the difference in mass-to-charge ratio between deuteron and anti-deuteron, and ${}^3\text{He}$ and ${}^3\bar{\text{He}}$ nuclei performed with the ALICE detector at the LHC is presented. The ALICE measurements improve by one to two orders of magnitude previous analogous direct measurements. Given the equivalence between mass and energy, the results improve by a factor two the constraints on CPT invariance inferred from measurements in the (anti-)deuteron system. The binding energy difference has been determined for the first time in the case of (anti-) ${}^3\text{He}$, with a precision comparable to the one obtained in the (anti-)deuteron system.