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

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In ultra relativistic heavy-ion collisions a large and similar amount of nuclei and anti-nuclei is produced in the central pseudorapidity region allowing one to deeply investigate their properties. Mass and electric charge are expected to be the same in nuclei and anti-nuclei as long as the CPT invariance holds for nuclear force, a remnant of the underlying strong interaction between quarks and gluons. In this talk the measurements of the difference of 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 will be presented for the first time. The measurements improve by one to two orders of magnitude analogous results previously obtained. They are also expressed in terms of binding energy differences. That related to the (anti-)deuteron improves by a factor two the constraints on CPT invariance inferred by existing measurements, while in the case of (anti-) ${}^3\text{He}$ it has been determined for the first time.

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