Production of nuclei, hyper-nuclei and exotics at the LHC

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The high collision energies reached at the LHC lead to significant production rates of light (anti-)(hyper-)nuclei in proton-proton, proton-lead and, in particular, lead-lead collisions. The excellent particle identification capabilities of the ALICE apparatus, based on the specific energy loss in the time projection chamber and the velocity information from the time-of-flight detector, allow for the detection of these (anti-)nuclei.

Furthermore, the high tracking resolution provided by the inner tracking system enables the separation of primary nuclei from those coming from the decay of heavier systems.

This allows for the reconstruction of decays such as the hypertriton (a bound state of a proton, a neutron and a Λ hyperon) mesonic weak decay (${}^{3}_{\Lambda}H \rightarrow {}^{3}He + \pi^{-}$), the decay of a hypothetical bound state of a Λ with a neutron into a deuteron and pion or the H-dibaryon (a hexaquark state consisting of *uuddss*, respectively a $\Lambda\Lambda$ bound state) decaying into a Λ, a proton and a π^{-}.

Results on the production of stable nuclei and anti-nuclei in lead-lead and lighter collision systems will be presented. Hypertriton production rates in Pb-Pb will also be shown, together with upper limits estimated on the production of hypothetical exotica candidates.

The results will be compared with predictions for the production in thermal (statistical) and coalescence models.