Production of (anti)(hyper)nuclei in Pb–Pb collisions measured with ALICE at the LHC

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In high-energy heavy-ion collisions nuclei and hypernuclei emerge from the hot and dense fireball formed in the reaction region. Thanks to its excellent particle identification and momentum measurement capabilities, the ALICE detector allows for the identification of deuterons, tritons, ^{3}He and ^{4}He and the corresponding anti-nuclei. This is achieved via the measurement of their specific energy loss in the Time Projection Chamber and the velocity measurement by the Time-Of-Flight detector. Moreover, by means of the Inner Tracking System capability to separate primary from secondary vertices, it is possible to identify (anti)hypertritons exploiting the mesonic weak decay ($^3_\Lambda\mathrm{H} \rightarrow (^3\mathrm{He} + \pi^-)$). The direct decay time measurement of (anti)hypertritons is difficult, but the excellent determination of primary and decay vertices allows for the measurement of lifetime via exponential fit of the proper decay time distribution $ct = MLc/p$, where M is the mass, L the decay length, c is the speed of light, and p is the total momentum.

Results on the measurement of the hypertriton lifetime will be shown along with the production yields of light (anti)nuclei and (anti)hypertriton in Pb–Pb collisions. Plans for the future LHC runs, called RUN2 and RUN3, with the expected improvements in the statistics and precision will be also presented.