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A study of the (anti)deuterons source in Pb–Pb collisions with ALICE

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The production of (anti)deuterons in relativistic heavy-ion collisions is currently well described by two models that point to different mechanisms of particle creation. The first of the two, the coalescence model, describes the (anti)deuteron's creation as a result of final-state interactions among (possibly off-shell) nucleons after the chemical freeze-out. The second, the thermal model predicts the formation of the (anti)deuterons inside the fireball even before the chemical freeze-out where these particles would be in equilibrium with other hadrons. The presented study aims to improve the understanding of deuterons production by studying the pion-deuteron source magnitude employing the femtoscopy method to determine the latter. The pion-deuteron particle-emitting source size can be evaluated as a function of the pair transverse mass m_{T} and can be compared to the source obtained for pion-pion pairs. Differences in the m_{T} scaling could help in discriminating between the coalescence and thermal scenario of (anti)deuteron's creation. The presented analysis is based on the measurement of femtoscopic correlation functions of pion-deuteron pairs in Pb–Pb collisions at $\sqrt{s_{\mathrm{NN}}} = 5.02$ TeV using the ALICE detector.

Primary author: RZESA, Wioleta (Warsaw University of Technology (PL))

Presenter: RZESA, Wioleta (Warsaw University of Technology (PL))

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