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A study of the (anti)deuterons source in Pb-Pb collisions with ALICE at the LHC.

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The production of (anti)deuterons in relativistic heavy-ion collisions is still theoretically not well understood. The particle yield can be qualitatively described by two 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 way of particle formation influences the characteristics of particle-emitting source and therefore, the experimental study of the source size of (anti)deuterons is one of the first steps for answering this question.

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. The study of pion-deuteron source with the femtoscopy method is used to improve the understanding of (anti)deuterons production. Therefore, the pion-deuteron particle-emitting source size evaluated as a function of the pair transverse mass m_{T} is compared to the results obtained for identical pairs of pions, kaons and protons. Knowledge about the source size of deuterons can be further used for constraining the details of the strong interaction of deuterons with other particles such as kaons or protons.

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