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Numerical analysis of background effects in identical pion femtoscopic correlations at the LHC

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This presentation considers the femtoscopic analysis of identical pions performed on Monte Carlo data. The studies were conducted on the data set of proton-lead (p-Pb) collisions at the centre-of-mass energy $\sqrt{s_{NN}} = 5.02$ TeV and proton-proton (pp) collisions at the centre-of-mass energy $\sqrt{s_{NN}} = 7$ TeV, obtained from the two selected Monte Carlo event generators: EPOS ver. 3.076 and PYTHIA ver. 6.4 Perugia-0 tune. The analysis was carried out using the femtoscopy technique which allows to study the space-time size and structure of the particle emitting sources created during particle collisions. The behaviour of the femtoscopic correlation functions is determined by the several correlation sources which have to be taken into account while performing the analysis. For identically charged pairs of pions the most visible effect originates from the Bose-Einstein quantum statistics. The characteristic femtoscopic structure at low relative momentum is the result of this effect. However, the experimental measurements are difficult due to the presence of significant additional non-femtoscopic correlation sources, which distort the femtoscopic structure in the region of the femtoscopic effect. Minijets are the most probable hypothesis of the origin of these structures. The main goal of these studies is to propose and validate a method which best describes femtoscopic correlations with taking into account non-femtoscopic effects in the extraction of the femtoscopic information in pp and p-Pb collisions.

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