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Violation of scaling of total charged-particle multiplicity normalized by the number of nucleons-participants in central Xe-Xe and Pb-Pb collisions

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We present a further development of the Modified Monte Carlo Glauber model (MGM) [1],[2], which takes into account at the given impact parameter of heavy nuclei interaction, for each nucleon, the fraction (k) of energy loss, arising during the consecutive inelastic nucleon-nucleon collisions due to multiple production of particles. The one-parameter model also takes into account, at each step of the consecutive binary collisions, the corresponding decreases of the inelastic cross section value and of the charged particles yield. We updated the MGM code for the collisions of the deformed nuclei and for the possibility to reveal the contributions by different certain numbers of binary collisions to the total charged-particle multiplicity. This study was motivated by the results [3] on the first measurements of the charged-particle multiplicity density and total charged-particle multiplicity in Xe-Xe collisions at a centre-of-mass energy per nucleon-nucleon pair of $\sqrt{s_{NN}} = 5.44$ TeV. The strong effect of violation of scaling of the total charged-particle multiplicity normalized by the number of nucleons-participants was observed in [3] in the region of very central Xe-Xe and Pb-Pb collisions. **We show for both undeformed and deformed nuclei, that our one-parameter model successfully explains the observed deviation of scaling with the number of nucleons-participants at the LHC energies.**

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[2] Feofilov G., Seryakov A. // AIP Conference Proceedings. 2016.1701.1. P. 07000

[3] ALICE Collaboration, //Physics Letters. B 790.2019. 35–48

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