

Application of EPOS4 and UrQMD (LHC) event generators to analyse 7 TeV pp collisions

In the study of heavy ion collisions, pp collision modeling plays an important role. We have carried out modeling of 7 TeV pp collisions using the EPOS4 [1] and UrQMD [2] event generators (LHC).

We found that both baryon and lepton charges B and L , as well as energy, are conserved when simulating scattering events using UrQMD. However, there is a small non-conservation of the electric charge, and there is a significant deviation in the distribution of events by the number of outgoing charged particles from that experimentally obtained at the ALICE detector [3].

We found that the EPOS4 simulation results show noticeable tails in the distributions of B - L , electric charge Q , and energy. With a number of generated events of several thousand, the EPOS4 generator poorly describes the multiplicity distribution of charged particles. With a sufficiently large number of events (about 20 thousand) the generator gives a distribution of events by the number of outgoing charged particles close to that observed experimentally at the ALICE detector [3]. For UrQMD generator, increasing the number of generated events to the same value did not improve the distribution.

Discarding events in which conservation laws do not hold significantly worsens the multiplicity distribution for both generators. Therefore, such filtering is impractical.

The study was carried out within the framework of the St. Petersburg State University project ID 94031112.

[1] K. Werner. Revealing a deep connection between factorization and saturation: New insight into modeling high-energy proton-proton and nucleus-nucleus scattering in the EPOS4 framework, Phys.Rev. C 2023, 108, 064903.

[2] S. A. Bass, M. Belkacem, M. Bleicher, et al. Microscopic Models for Ultrarelativistic Heavy Ion Collisions Prog. Part. Nucl. Phys. 1998, 41, p. 225-370.

[3] Adam, J., Adamová, D., Aggarwal, M.M. et al. Charged-particle multiplicities in proton-proton collisions at to 8 TeV. Eur. Phys. J. C 2017, 77, 33.

Section

Heavy ion collisions at Intermediate and high energies

Primary author: Mr RAZMYSLOV, Konstantin (Saint Petersburg State University)

Co-authors: Prof. VALIEV, Farhat (Saint Petersburg State University); Mr ZHAROV, Michael (Saint Petersburg State University); Prof. MONAKHOV, Vadim (Saint Petersburg State University)

Presenter: Mr RAZMYSLOV, Konstantin (Saint Petersburg State University)

Session Classification: Poster session