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Hypernuclei and light nuclei production with phase space coalescence in UrQMD

Tuesday 14 June 2022 10:00 (20 minutes)

In this talk we will present recent results on light nuclei and hypernuclei production in heavy ion collisions over a wide beam energy range from the SIS18 to the LHC. Light clusters with mass number up to $A=3$ can be well described by a phase-space coalescence approach implemented in the microscopic transport model UrQMD. I will show that the final multiplicities for nuclear clusters in many experiments can be well described with this approach which assumes the formation of nuclei after kinetic freeze out and using only the two phase space separation parameters for deuterons and tritons. As expected for coalescence the coalescence parameters B_2 and B_3 scale with the appropriate power of the system volume for central collisions. Results for the centrality dependence of nuclei production will be presented. They show a breaking of this scaling for peripheral collisions. In addition, some special ratios will be discussed, like the $t * p/d^2$ or ${}^3_{\Lambda}H/{}^3He * p/\Lambda$ ratio and how they depend on the beam energy. The possibilities of the creation of more exotic nuclei like those including a Ξ or even charmed baryons will also be discussed.

This talk is based on:

[1] P. Hillmann, K. K\"{a}fer, J. Steinheimer, V. Vovchenko and M. Bleicher, [arXiv:2109.05972 [hep-ph]], accepted for publication in Journ.Phys.G.

[2] S. Sombun, K. Tomuang, A. Limphirat, P. Hillmann, C. Herold, J. Steinheimer, Y. Yan and M. Bleicher, Phys. Rev. C 99, no.1, 014901 (2019).

[3] J. Steinheimer, A. Botvina and M. Bleicher, Phys. Rev. C 95, no.1, 014911 (2017).

Present via

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