

Formation of clusters and the chemical freeze-out in heavy-ion collisions

Saturday 24 September 2022 17:50 (20 minutes)

We discuss medium effects on light cluster production in the QCD phase diagram within a generalized Beth-Uhlenbeck (GBU) approach by relating Mott transition lines to those for chemical freeze-out. We find that in heavy-ion collisions at highest energies provided by the LHC light cluster abundances should follow the statistical model because of low baryon densities [1]. Chemical freeze-out in this domain is correlated with the QCD crossover transition. At low energies, in the nuclear fragmentation region, where the freeze-out interferes with the liquid-gas phase transition, selfenergy and Pauli blocking effects are important [2,3]. We demonstrate that at intermediate energies the chemical freeze-out line correlates with the Mott lines for light clusters provided their dependence on the cluster momentum relative to the medium is taken into account [4]. It is important to consider the nonzero thermal momentum because moving clusters are stabilized compared to those at rest in the dense medium. In this domain, the HADES, FAIR and NICA experiments can give new information.

References

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Session Classification: Phenomenology