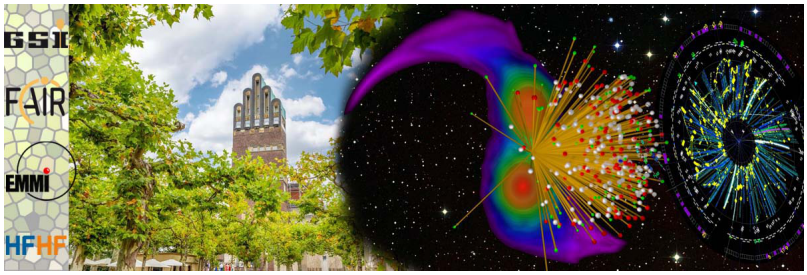

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When and where are clusters formed in expanding systems? (online)

Thursday, 21 September 2023 16:30 (20 minutes)

In central heavy-ion collisions at several hundred MeV/nucleon, a compressed nuclear system is formed up to about twice the saturation density and then rapidly expands, to produce a lot of light clusters. Recently, cluster observables from the SpiRIT experiment have been compared with the AMD calculation in some published papers and a paper in preparation. Some cluster observables showed sensitivity to the density dependence of symmetry energy. However, it still has to be clarified how the clusters ultimately emitted into free space can convey information about the compressed nuclear matter.

In this short contribution, I will present my recent investigation on the space-time point of two-nucleon collisions in the time evolution of central heavy-ion collisions. In the version of AMD with cluster correlations, a two-nucleon collision may form cluster(s) in the final state as N1 + N2 + B1 + B2 $\rightarrow$ C1 + C2. The analysis shows that clusters, especially A=3 clusters, are most frequently formed in the central part of the system around the time of the maximum compression. Many clusters survive until they are spatially separated, due to the simple expansion of the system. This implies a promising potential to obtain valuable information on the high-density phase from cluster observables. The influence of the Mott effect will also be discussed.

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