# Recent calculations on multifragmentation using quantum molecular dynamics approach

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One of the most fascinating processes that occur at intermediate energy is the breaking of excited nuclei into various pieces. The recent past has witnessed tremendous growth in this field (known as multifragmentation). As evident from the literature, various aspects of fragmentation have been studied both theoretically as well as experimentally. We aim to shed light on some of the aspects of multifragmentation, which have been investigated by us recently. In particular, we will discuss 1) the role of thermal effects in fragmentation pattern by considering the fragments to be at finite temperature, 2) the behavior of light charged particles and other various mass fragments formed during break up of excited nuclear matter towards beam energy and 3) the role of in-medium effects incorporated via nucleon-nucleon scattering cross sections in the dynamics of fragmentation. In this direction, various dynamical models have been proven to be one of the significant tools to understand the physics of multifragmentation and we will use *quantum molecular dynamics* model for our study. Firstly, we incorporate thermal effects in fragmentation via clusterization algorithm which otherwise have implemented cold matter binding energies in the past. Our findings reveal significant role of the temperature on fragment structure.

Another important observation is regarding the light charged particles (LCPs) which are copiously produced during the fragmentation and are found to carry information about the hot/dense nuclear matter. We investigated energy dependence of LCPs multiplicity and observed a rise and fall behavior as has been reported also for intermediate mass fragments IMFs (and thought to be a signature of liquid-gas phase transition). Finally, we study the influence of in-medium effects by incorporating the same through nucleon-nucleon scattering cross section. For this, we compared the results obtained from free nucleon-nucleon cross sections with those obtained from reduced nucleon-nucleon cross sections.

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