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Equilibration dynamics in nuclear reactions

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Low-energy heavy-ion reactions provide us a rich laboratory to study the equilibration dynamics of strongly interacting many-body systems. In particular, these reactions probe an intriguing interplay between the microscopic single-particle dynamics and collective motion at time scales too short for complete equilibration. In this presentation, we discuss recent microscopic studies of equilibration dynamics in deep-inelastic, quasi-fission, and fusion reactions. In this context we will discuss the equilibration dynamics and time-scales for various quantities that are connected to the experimentally observable entities. These include the study of mass, isospin, and total kinetic energy (TKE) equilibration time-scales. In most of these studies one is essentially dealing with the transport phenomena of isospin asymmetric systems [1,2]. These investigations provide us the ingredients to model such phenomena and help answer important questions about the nuclear Equation of State (EOS) and its evolution as a function of neutron-to-proton N/Z ratio [3].

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