Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Exact analysis of prethermalization of a coherently split one-dimensional Bose gas ERIKO KAMINISHI, TATSUHIKO IKEDA, TAKASHI MORI, MASAHITO UEDA, Dept. of Physics, University of Tokyo — We theoretically study the prethermalization dynamics of a coherently split one-dimensional Bose gas by using the Bethe ansatz method. Prethermalization is a relaxation process to a quasi-stationary state before reaching the true equilibrium state. The concept of prethermalization is important for understanding the fundamental aspects of quantum statistical mechanics such as "equilibration" and "relaxation" in isolated quantum many-body systems. Prethermalization and its connection to integrability in one-dimensional quantum systems have been intensively studied by both experiments and theories. For instance, M. Gring et al. recently observed the evolution of a rapidly and coherently split one-dimensional Bose gas for large numbers of particles and compare the evolution of the system to the prediction of the Tomonaga-Luttinger liquid (TLL) theory. Here we employ the Bethe ansatz method and precisely analyze the prethermalization process over a long-time scale beyond the TLL prediction.

Eriko Kaminishi
Dept. of Physics, University of Tokyo

Date submitted: 11 Nov 2013 Electronic form version 1.4