Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Exact soliton solutions in a many-body system in non-trivial background[1] ANDREY GROMOV, ALEXANDER ABANOV, Stony Brook University, MANAS KULKARNI, University of Toronto — Soliton solutions are usually described as lumps of density propagating without changing their shape. They usually occur in integrable systems. We consider the classical Calogero model in an external harmonic potential. Due to the presence of the external potential, momentum in the system is not conserved and the aforementioned description of solitons is inapplicable, nevertheless the system remains integrable. Naturally, the question about the existence and the form of soliton solutions arises. I will explain what a soliton solution of this model is and I will show how to find these solutions in the case of finite number of particles and in the hydrodynamic limit. In the latter limit the model is described by hydrodynamic equations on continuous density and velocity fields. Soliton solutions in this case are finite dimensional reductions of the hydrodynamic model and describe the propagation of lumps of density and velocity in the nontrivial background. These solutions of Calogero model were previously qualitatively described by A. Polychronakos in the context of the quantum Hall effect.

[1]The work was supported by the NSF under grant no DMR-0906866

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Date submitted: 10 Nov 2011 Electronic form version 1.4