

Abstract Submitted
for the DAMOP16 Meeting of
The American Physical Society

Slow dynamics in many-body quantum systems with long range interactions¹ LEA SANTOS, Yeshiva University, FRANCISCO PEREZ-BERNAL, Universidad de Huelva — In recent experiments with ion traps the range of the interactions between spins-1/2 can be controlled. In the limit of infinite-range interaction the system may be described by the Lipkin model, which exhibits an excited state quantum phase transition (ESQPT). The latter corresponds to a singularity in the spectrum that occurs at the ground state and propagates to higher energies as the control parameter increases beyond the ground state critical point. We show that the evolution of an initial state with energy close to the ESQPT critical point may be extremely slow. This result is surprising, since the dynamics is usually expected to be very fast in systems with long-range interactions. This behavior is justified with the analysis of the structures of the eigenstates.

¹This work was supported by the NSF grant No. DMR-1147430.

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Date submitted: 13 Jan 2016

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