Excited-state quantum phase transitions[1] LEA SANTOS, Yeshiva University, FRANCISCO PREZ-BERNAL, Universidad de Huelva — Excited-state quantum phase transitions (ESQPTs) are generalizations of quantum phase transitions to excited levels. They are associated with local divergences in the density of states. We show how the presence of an ESQPT can be detected also from the analysis of the structure of the Hamiltonian matrix, the level of localization of the eigenstates, the onset of bifurcation, and the speed of the system evolution. Our findings are illustrated for the Lipkin-Meshkov-Glick (LMG) model, which is the limiting case of the one-dimensional spin-1/2 system with tunable interactions realized with ion traps. From our studies for the dynamics, we uncover similarities between the LMG and the noninteracting XX model.

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Date submitted: 10 Nov 2016   Electronic form version 1.4