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Many-body dynamics of the transverse-field Ising model ALEXANDER PIKOVSKI, JOHANNES SCHACHENMAYER, ANA MARIA REY, JILA, NIST and Department of Physics, University of Colorado, Boulder — We investigate the quantum Ising model with a transverse driving field. This model can describe the dynamics of a gas of Rydberg atoms, and also related to systems of cold polar molecules or trapped ions. The time-dependent many-body dynamics of this system is studied using different numerical methods. We compare the results obtained by truncated Wigner approximation, modified cluster expansion, as well as a novel high-order in time expansion method. It is found that the accuracy of the different methods is strongly dependent on the interaction range and the dimensionality of the system.

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