

Abstract Submitted
for the DAMOP13 Meeting of
The American Physical Society

The Multi-Layer Multi-Configuration Time-Dependent Hartree Method for Bosons: Theory and Applications LUSHUAI CAO, SVEN KRÖNKE, Center for Optical Quantum Technologies, Hamburg University & The Hamburg Centre for Ultrafast Imaging, ORIOL VENDRELL, Center for Free-Electron Laser Science, DESY & The Hamburg Centre for Ultrafast Imaging, PETER SCHMELCHER, Center for Optical Quantum Technologies, Hamburg University & The Hamburg Centre for Ultrafast Imaging — We introduce the multi-layer multi-configuration time-dependent Hartree method for bosons (ML-MCTDHB), which represents a unique tool for investigating the nonequilibrium dynamics of multi-species bosonic systems in arbitrary dimensions. Being an ab initio method for solving the time-dependent Schrödinger equation, ML-MCTDHB takes all correlations into account. The multi-layer feature of ML-MCTDHB allows for tailoring the wave function ansatz in order to describe intra- and inter-species correlations accurately and efficiently. Examples are shown here to demonstrate the beneficial scaling and the efficiency of the method, especially in the study of nonequilibrium dynamics.

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Date submitted: 10 Apr 2013

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