Abstract Submitted
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Quantum dynamics of the dissociation of a molecular BEC into fermionic atoms JOEL CORNEY, MAGNUS ÖGREN, KAREN KHERUNTSYAN, University of Queensland — We numerically simulate the exact quantum many-body dynamics of bosonic dimers dissociating into fermionic atoms by applying a Gaussian phase-space representation. The accuracy for higher-order correlations is demonstrated by comparison with a standard matrix representation for small systems of 10 molecules and 10 atomic modes. We then give results for systems of $10^2 - 10^4$ molecules and 10^3 atomic modes, illustrating the potential capability of the phase-space representation for first-principles quantum dynamical simulations for fermionic systems of realistic sizes in current experiments. Molecule-atom correlations and the decoherence of the initially condensed molecules are studied as time evolves, with clear deviations from the approximate pairing mean-field theory.

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