

Abstract Submitted
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Bent dark soliton dynamics in two spatial dimensions beyond the mean field approximation¹ SIMEON MISTAKIDIS, GARYFALLIA KATSIMIGA, GEORGIOS KOUTENTAKIS, Center for Optical Quantum Technologies, University of Hamburg, PANAGIOTIS KEVREKIDIS, Department of Mathematics and Statistics, University of Massachusetts Amherst, PETER SCHMELCHER, Center for Optical Quantum Technologies, University of Hamburg, THEORY GROUP OF FUNDAMENTAL PROCESSES IN QUANTUM PHYSICS TEAM — The dynamics of a bented dark soliton embedded in two spatial dimensions beyond the mean-field approximation is explored. We examine the case of a single bented dark soliton comparing the mean-field approximation to a correlated approach that involves multiple orbitals. Fragmentation is generally present and significantly affects the dynamics, especially in the case of stronger interparticle interactions and in that of lower atom numbers. It is shown that the presence of fragmentation allows for the appearance of solitonic and vortex structures in the higher-orbital dynamics. In particular, a variety of excitations including dark solitons in multiple orbitals and vortex-antidark complexes is observed to arise spontaneously within the beyond mean-field dynamics.

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