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Chaotic Dynamics of a Dipolar Bose-Einstein Condensate ROXANNE MORAN, BOAZ ILAN, KEVIN MITCHELL, None — Recent theoretical work has shown that short-range contact and long-range dipole-dipole interactions of a Bose-Einstein condensate provide the stability needed for the formation of a two-dimensional soliton in a chaotic optical-dipole potential. However, inclusion of the dipole-dipole interaction causes the BEC soliton to deviate from the classical trajectories of the trapping potential and to instead follow trajectories given by an effective potential; the effective potential is the convolution of the trapping potential with the BEC density. Here, we study the transition from purely Schrodinger evolution in the trapping potential to soliton evolution in the effective potential. This transition from Schrodinger to soliton behavior can be viewed as an alternative kind of classical transition, distinct from the usual Ehrenfest wavepacket approach in which hbar goes to zero. We also explore the increase in fractal resolution in the escape-time data as the soliton limit is approached.

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None

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