

Effective dynamics of dark solitons in a slowly varying interaction field

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The defocusing cubic nonlinear Schrodinger equation in one space dimension supports dark solitons, which are asymptotically of unit amplitude with a local depression. We consider this model with a slowly varying momentum perturbation, and show that the dark solitons remain structurally intact with modulation of position and shape on a dynamically relevant time scale. Previous results of this type have been obtained for bright solitons in many contexts, and we extend these methods to dark solitons via the Madelung transform, energy Lyapunov, and local virial estimates. This is joint work with Numann Malik (The College of New Jersey).

In Special Session 24 on Nonlinear Dispersive Equations at the Mathematical Congress of the Americas 2025.