

# Small-Amplitude Nonlinear Modes under the Effect of the Parabolic Potential, Nonlocality and PT Symmetry

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We consider nonlinear modes of the nonlinear Schrödinger equation with nonlocal nonlinearities and PT -symmetric parabolic potential. We show that there exists a set of continuous families of nonlinear modes and study their linear stability in the limit of small nonlinearity. It is demonstrated that either PT symmetry or the nonlocality can be used to manage the stability of the small-amplitude nonlinear modes. The stability properties are also found to depend on the particular shape of the nonlocal kernel. Numerical simulations show that the stability results remain valid not only for the infinitesimally small nonlinear modes, but also for the modes of finite amplitude.