Localized modes in nonlocal nonlinear Schrödinger equation with $\mathcal{PT}$-symmetric parabolic potential

D. A. Zezyulin[1,3], G. L. Alfimov[2], and V. V. Konotop[1],

[1] Centro de Física Teórica e Computacional, Faculdade de Ciências, Universidade de Lisboa, Instituto para Investigação Interdisciplinar, Avenida Professor Gama Pinto 2, Lisboa 1649-003, Portugal

[2] National Research University of Electronic Technology "MIET", Moscow, 124498, Russia

[3] email: *zezyulin@cii.fc.ul.pt*

Abstract:

We consider localized solutions of the nonlinear Schödinger equation with nonlocal nonlinearity and the complex $\mathcal{PT}$-symmetric potential $x^2 - 2i\alpha x$. We identify families of localized modes bifurcating from the eigenstates of the underlying linear problem and numerically extend the solutions in the region of strong nonlocal nonlinearity. We also examine stability of the found solutions and discuss interesting differences between properties of our model and cases with the real parapolic potential and local nonlinearity studied before [1]. Several types of the nonlocal nonlinearity will be addressed.

References:

1. D. A. Zezyulin, and V. V. Konotop, Phys. Rev. A **85**, 043840 (2012).