Vladimir Konotop (Universidade de Lisboa, Portugal)

Title: Non-Hermitian gauge potentials: wave amplification and solitons.

Abstract: Continuous one-dimensional non-Hermitian matrix gauge field can be created using double-core nonlinear optical waveguides with distributed gain and losses. Such gauge fields lead to a variety of unusual phenomena including superexponential convective amplification and linear finite-distance blow up manifesting itself in total delocalization of a beam preserving a finite amplitude. The defocusing Kerr nonlinearity initially enhances amplification of an input beam, while at longer distances it suppresses the growth of the total power. The focusing nonlinearity at short distances slows down the power growth but eventually results in modulational instability at larges distances. Complex periodic gauge fields sustain families of stable fundamental and dipole solitons. Such solitons can be stable in one-dimensional approximation and become metastable when both traverse directions are considered. This work is done in collaboration with Y. V. Kartashov (Institute of Spectroscopy, Troitsk, Russia) and D. A. Zezyulin (ITMO University, St. Petersburg, Russia).

References:

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