

DISCRETE 2014: Fourth Symposium on Prospects in the Physics of Discrete Symmetries



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Solitons, soliton vortices and PT-symmetry in spin-orbit coupled Bose-Einstein condensates.

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Spin-orbit coupled Bose-Einstein condensates (SO-BECs), which in the meanfield approximation are governed by two linearly coupled Gross-Pitaevskii equations, allow for the existence of many types of localized non-linear excitations: fundamental and multipole solitons, soliton half-vortices, etc. In the first part of the talk, such excitations will be considered in the presence of so-called Zeeman lattice (i.e. periodic potential which is π -shifted in both components). I will discuss classification of the solutions with respect to the parity, time, pseudo-charge, and lattice symmetries. In the second part of the talk, a homogeneous SO-BEC will be considered in the presence of mechanisms of loading and loosing atoms. Spontaneous PT-symmetry breaking scenarios, as well as nonlinear modes in such SO-BECs will be described.

Primary author: Prof. KONOTOP, Vladimir (Universidade de Lisboa)

Co-authors: Dr ZEZYULIN, Dmitry (Universidade de Lisboa); Prof. KARTASHOV, Yaroslav (ICFO-Institut de Ciencies Fotoniques, Spain)

Presenter: Prof. KONOTOP, Vladimir (Universidade de Lisboa)

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