UCCS Department of Mathematics

Math Colloquium Series

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DATE:
APRIL 28, 2016

TIME:
12:30PM-1:30PM
(REFRESHMENTS AT 12:15PM)

LOCATION:
OSBORNE CENTER
ROOM# A327

Adiabatic Perturbation Theory for Vector NLS and Application in BECs

Abstract: We develop an adiabatic perturbation theory for a two-component setting of dark-bright solitons and derive the equation of motion for the soliton parameters. Adopting a mean-field description for a two-component atomic Bose-Einstein condensate, we study the statics and dynamics of dark-bright solitons in the presence of localized impurities. We use adiabatic perturbation theory to derive an equation of motion for the dark-bright soliton center. We show that, counter intuitively, an attractive (repulsive) delta-like impurity, acting solely on the bright soliton component, induces an effective localized barrier (well) in the effective potential felt by the soliton; this way, dark-bright solitons are reflected from (transmitted through) attractive (repulsive) impurities. Our analytical results for the small-amplitude oscillations of solitons are found to be in good agreement with results obtained via a Bogoliubov-de Gennes analysis and direct numerical simulations.

Please contact the UCCS Math Department at (719) 255-3311 for more information