



深圳北理莫斯科大学

УНИВЕРСИТЕТ МГУ-ППИ В ШЭНЬЧЖЭНЕ
SHENZHEN MSU-BIT UNIVERSITY

应用数学讲座

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报告人 / Докладчик / Speaker: Lysak 副教授 (深圳北理莫斯科大学)

题目 / Название / Title: Self-similar laser beams at second harmonic generation in PT-symmetric periodic structures: mathematical modeling

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摘要 / Аннотация / Abstract:

The report is devoted to numerical and theoretical investigation of femtosecond laser radiation propagation in Parity-Time (PT) -symmetric periodic structures with quadratic nonlinearity. Two-color parametric gap solitons with unusual properties can be formed in such structures due to the interplay between nonlinearity, Bragg reflection and gain/loss profile. The mathematical model is based on four coupled nonlinear Schrodinger equations which take into account Bragg resonance on both frequencies. Conservation laws (invariants) were derived for this model. For numerical simulation, conservative difference schemes that preserve the differential analogues of the invariants of the problem were developed, which is crucial for solving nonlinear problems. Based on these conservative difference schemes, numerical simulations of self-similar laser beams propagation in active PT-symmetric periodic structures were carried out. In particular, the influence of the incident beam width on reflection/transmission properties of active and passive periodic structures was investigated under conditions of single and double Bragg resonance.