

Friday, March 15th (at 4.00pm, UK time)

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Title Solitons and soliton interactions in the complex coupled short-pulse equation.

ABSTRACT

The complex coupled short-pulse equation (ccSPE) describes the propagation of ultra-short optical pulses in nonlinear birefringent fibers. The system admits a variety of vector soliton solutions: fundamental solitons, fundamental breathers, composite breathers, and self-symmetric solitons which are special cases of composite breathers.

In this talk, we discuss the nature of ccSPE soliton interactions. Using Manakov's method, we describe the interaction between two fundamental solitons, in which case there exists redistribution of energy between the components unless the initial polarization vectors are either parallel or orthogonal. To describe more complicated soliton interactions, we rely on Darboux matrices corresponding to the various types of solitons, combining refactorization problems on generators of certain rational loop groups and long-time-asymptotics of these generators. This leads to the derivation of various Yang-Baxter maps for the polarizations of the solitons, which allows to completely characterize all types of soliton interactions in the ccSPE.
