Tamara Grava (University of Bristol) tamara.grava@bristol.ac.uk

Soliton gas in integrable PDEs

The concept of a soliton gas was introduced by Zakharov in 1971 and further developed by El in 2003, modeling solitons as interacting particle-like structures. In recent years, rigorous analytical results have been established that provide confirmation of the qualitative theory. In this talk, I will describe some of these advances, including (1) a rigorous derivation of kinetic equations governing soliton gases in KdV-type systems without randomness, as well as (2) the analysis of random collections of solitons, in which both mean behavior and fluctuation results are established. This is a joint work with several teams, including Manuela Girotti, Robert Jenkins, Ken McLaughlin, Guido Mazzuca, and Oleksandr Minakov.