

Changing solitons in classical & quantum integrable defect and variable mass sine-Gordon models

Anjan Kundu

May 17, 2007

1. Theory Group, Saha Institute of Nuclear Physics, Calcutta, INDIA

Sine-Gordon is a fascinating model, integrable both at the classical and the quantum level, with rich exact solutions like kink, breather and higher solitons with nontrivial topological charges. Its wide application ranges from modeling fluxons in Josephson junction, spin waves in ferromagnet to solving nonperturbative QFT problems. Study of this model with inhomogeneity, defect and accelerating solitons attracted special interest, though these aspects usually take the system beyond integrability, thus losing its most cherishable characteristic. We however construct a classical and quantum integrable sine-Gordon model with defect which can change the soliton number across the defect and also find a variable mass integrable (classical and quantum) SG model which allows accelerating and shape changing solitons along the propagation.