

量子物理学・ナノサイエンス第 110 回特別セミナー

## New integrable models of interacting particles: gases of solitons and a universal description of integrable dynamics at large scales

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日程	:	6月3日(火)13:00-14:00
場所	:	本館地下 B61 物理学系輪講室

要

## Solitons in integrable models such as the KdV equation, are known to have a very special property sometimes referred to as "factorised scattering": they keep their shapes and velocities after crossing and interacting, even in many-soliton scattering, except for Wigner shifts of their trajectories. The Wigner shifts separate into two-soliton shifts, and only depend on the velocities of the solitons (and possibly other of the soliton's parameters). We construct a family of models of interacting Hamiltonian classical particles, instead of solitons, that have exactly this property, where the Wigner shift of particles' trajectories can be set to almost any function of the particles' velocities. It turns out that this gives a precise description of the motion of solitons, and, we believe, a universal description of the large-scale dynamics of integrable models at all orders of the hydrodynamic expansion. These models are integrable, and using the "matrix-tree theorem" we show rigorously that the thermodynamic Bethe ansatz gives their free energy in terms of simple integral equations. We also show (although not yet rigorously) that their large-scale dynamics is described by the equations of generalised hydrodynamics.