Dispersive shock waves in interacting one-dimensional systems and edge states of fractional QHE

Alexander G. Abanov
Department of Physics & Astronomy
Stony Brook University

ABSTRACT

I am going to discuss the hydrodynamic description of many body systems in one spatial dimension. For the simplest integrable models in one dimension, such as Calogero-Sutherland model, it is possible to find an exact quantum hydrodynamic description of the system. The exact form of hydrodynamic equations is very specific to the integrable model under consideration. However, the hydrodynamic description itself is based on local conservation laws and is intrinsically universal. The presence of nonlinear and dispersive terms in hydrodynamic equations leads to the effects which are missed in the linearized hydrodynamic description (bosonization). I plan to describe one of such effects – the formation of dispersive shock waves. I will discuss the relevance of this phenomenon to the dynamics of edge states in fractional Quantum Hall Effect.