On the hydrodynamic description of FQHE fluid[1]
ALEXANDER ABANOV, Stony Brook University — A simple classical two-dimensional hydrodynamic model for FQHE fluid has been constructed. Hydrodynamics of this model is Hamiltonian, nonlinear and has many features of fractional quantum Hall states. The effective classical fluid is incompressible and has a correct static structure factor. The model incorporates FQHE relation between the density and the vorticity of the fluid, gives the correct value for the Hall viscosity and for the Hall conductivity at finite wavevectors. The model can serve as a starting point in deriving the boundary theory of FQHE states beyond chiral Luttinger liquid. Indeed, in the leading approximation the model is reduced to chiral waves with nonlinearities defined by a curvature of the confining potential.

Alexandre Abanov
Stony Brook University

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