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Experiments with linear, nonlinear, and topological excitations in a superfluid gas

Experimentally, the dynamics of a bose-condensed gas of rudidium is known to be described to a very high degree of accuracy by the Gross-Pitaevskii equation (GPE). I will present a number of solutions to the GPE derived on our “analog quantum simulator”, including Tkakchenko modes in a lattice of quantized vortices, and shock waves.