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Conserved energies for the Gross-Pitaevskii equation

The Gross-Pitaevskii equation is essentially the defocusing Nonlinear Schrödinger equation with nontrivial conditions at infinity. It admits dark soliton solutions. I will explain the geometric and topological structure of the finite energy space for the Gross-Pitaevskii equation. The GP equation has a Lax pair. An approximate diagonalization of the Lax equation is a basis for the construction of conserved energies E^s for all $s \geq 0$.

This is joint work with Xian Liao.