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Stability of the black soliton for the NLS equation

We will discuss travelling wave solutions to the Gross–Pitaevskii equation in dimension 1, 2 and 3. In 1D, a special example is given by the well-known kink $v_0(x) = \tanh(\frac{x}{\sqrt{2}})$, which is actually stationary. The kink has long been known to be stable for the dissipative evolution flow, which in this case is the Allen–Cahn equation. In a joint work with F. Bethuel, P. Gravejat and J.-C. Saut, we prove that it is orbitally stable for the Hamiltonian flow.