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*Orbital stability of dark solitons for the intermediate nonlinear Schrödinger equation*

The intermediate nonlinear Schrödinger equation models the envelope of weakly nonlinear internal waves in a stratified fluid of finite depth. It admits two families of dark solitons, traveling waves that appear as localized dips in intensity on a nonzero background. In this talk, I will show that both families are orbitally stable in two regimes. The first occurs when the fluid is sufficiently shallow and the soliton width is bounded below. The second occurs at large depth, provided the soliton is sufficiently wide compared with the depth. In either regime, a small perturbation stays close to the soliton for all time, up to translation and phase rotation.

The proof explains why a shallow-water approximation remains useful even at large depth. In hydrodynamic variables, stability reduces to a spectral question for a nonlocal operator. On the scale of the soliton, the comparison operator is the familiar linearization about a Korteweg–de Vries solitary wave.

This is joint work with Takafumi Akahori and Nobu Kishimoto.