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**Gino Biondini\*** (biondini@buffalo.edu), Buffalo, 14260, and **Emily Fagerstrom**, Buffalo, NY 14260. *The Benjamin-Feir instability revisited.*

The modulational instability (MI), also known as Benjamin-Feir instability in the context of water waves, is one of the most widespread phenomena in nonlinear science. In many cases, the underlying dynamics is governed by the nonlinear Schrodinger (NLS) equation. The initial stage of MI can therefore be described by linearizing the NLS equation around a constant background. Once the perturbations have grown, however, the linearization ceases to be valid. On the other hand, the NLS equation is a completely integrable infinite-dimensional Hamiltonian system, and the initial-value problem is therefore amenable to solution via the inverse scattering transform (IST). In this talk I will describe how the recently-developed IST for the focusing NLS equation with non-zero boundary conditions can be used to elucidate the nonlinear stage of the MI. (Received January 24, 2014)