1036-76-175 **Diane M Henderson*** (dmh@math.psu.edu), 218 McAllister Building, Department of Mathematics, Penn State University, University Park, PA 16803, and **Harvey Segur**. *On the stability of deep-water surface waves.*

We consider both experimentally and theoretically, the stability of traveling waves propagating in 1 and 2 dimensions that have uniform amplitudes. In the absence of dissipation, a uniform wavetrain propagating in 1d is unstable to a modulational instability (the Benjamin-Feir instability). More recently it has been shown that a uniform amplitude, bi-periodic wave pattern is similarly unstable in the absence of dissipation. These instability results can be modeled using the nonlinear Schrödinger equation (NLS) and coupled NLS equations for the waves in 1 and 2d. We show with theory and experiments that any amount of damping of the right type stabilizes these instabilities. Our experiments show that the inclusion of damping is necessary in order for the NLS equations to model observations accurately when the carrier wave amplitude and the initial perturbation amplitudes are small. If one of them is not, then these models (with or without damping) are not valid: the experiments show that for large amplitude waves, quantities conserved by the model are not conserved in the experiments. (Received January 22, 2008)