Abstract Submitted
for the DFD11 Meeting of
The American Physical Society

**On the onset of instability in self-induced shears by large amplitude internal waves**[1] ROBERTO CAMASSA, CLAUDIO VIOTTI, University of North Carolina, UNC RTG FLUIDS GROUP TEAM — Large amplitude internal waves in stratified fluids generate a shear layer which can support Kelvin-Helmholtz instabilities when the pycnocline is sharp enough. The way perturbations propagate along such nonparallel shear flows and eventually excite the local unstable modes is not fully understood, and differences from the parallel setup can be expected. Here we consider the specific case of a solitary wave interacting with prescribed upstream baroclinic perturbations with the aim of assessing the role of the self-induced shear flow on the evolution of the perturbation. We present a few preliminary results documenting how internal waves exhibit a subtle selectivity on the nature of the perturbation itself, which affects the outcome between the two extremes from net amplification to net damping, even in locally-unstable conditions. By varying the parameters of the perturbation (wavenumber, phase speed or frequency) we find that frequency correlates best with the overall growth/decrease trend, thereby favoring an interpretation of the underlying mechanism in terms of quasi-spatial instability.

[1]NSF DMS RTG 0943851, NSF DMS 1009750

Richard McLaughlin
UNC

Date submitted: 11 Aug 2011 Electronic form version 1.4