

Abstract Submitted  
for the DFD11 Meeting of  
The American Physical Society

**Interaction of an internal tide beam with an upper ocean pycnocline** BISHAKHDATTA GAYEN, SUTANU SARKAR, UCSD — Direct numerical simulation and linear inviscid theory are used to study the interaction of an internal wave beam with an upper ocean pycnocline at different values of Froude number,  $Fr$ . At low  $Fr$ , both theory and numerics agree well as to the behavior of the internal wave beam after reflection. At moderate values of  $Fr$ , nonlinear response initiates the formation of higher harmonics. The harmonics that have frequency higher than the buoyancy frequency of the lower medium, are unable to propagate into the lower medium. These harmonics, affected by multiple reflections inside the pycnocline, are trapped. At high value of  $Fr$ , the IW beam undergoes shear instabilities during its tunneling through the transitional layer of the pycnocline. The role of turbulence in modifying the internal wave beam structure will be discussed.

Bishakhdatta Gayen  
UCSD

Date submitted: 04 Aug 2011

Electronic form version 1.4