

Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

Subharmonic instability during the off-critical reflection of an internal wave beam VAMSI KRISHNA CHALAMALLA, SUTANU SARKAR, Univ of California - San Diego — Numerical simulations at laboratory scale are performed to study the reflection of an internal wave beam at a sloping bottom. When the incoming wave Froude number Fr_i is small, the reflection process can be approximated by linear theory and almost all of the reflected energy is confined to the primary wave frequency. In cases where the incoming wave Froude number Fr_i is sufficiently high (≈ 0.07 in the present study) and the internal wave angle is close to but greater than the slope angle, the reflected wave undergoes parametric subharmonic instability (PSI) resulting in the formation of two subharmonic waves with frequencies 0.33Ω and 0.67Ω . The energy in the subharmonics is found to be of the same order as that in the primary reflected beam. PSI is not found during critical reflection ($\alpha = \beta$) at any incoming wave Froude number. Thus, reflection of internal waves at a near but off-critical slope provides a potential mechanism for mixing through the generation of subharmonic waves with smaller vertical scales that could break down into turbulence.

Vamsi Krishna Chalamalla
Univ of California - San Diego

Date submitted: 30 Jul 2014

Electronic form version 1.4