1086-76-1731 **Catherine Sulem*** (sulem@math.toronto.edu), Department of Mathematics, University of Toronto, 40 St George Street, Toronto, Ontario M5S2E4, Canada. *Coupling between internal and surface waves in a two-layers fluid.*

Internal waves that occur within a fluid stratified by temperature or salinity variation, are commonly generated in the oceans. They appear as large amplitude, long wavelength nonlinear waves and can propagate over large distances.

In some physically realistic situations, the visible signature of internal waves on the surface of the ocean is a band of roughness, sometimes referred to as a 'rip' which propagates at the same velocity as the internal wave, followed after its passage, by the 'mill pond' effect, the complete calmness of the sea.

We propose an asymptotic analysis of the coupling between the interface and the free surface of a two layers fluid in a scaling regime chosen to capture these observations. In particular, we describe the rip region of the free surface as being generated by the resonant coupling between internal solitons and the free-surface wave mode. We also give an explanation of the mill pond effect as the result of a strong reflection coefficient for free-surface waves in the modulational regime, in a frame of reference moving with the internal soliton.

This is a joint work with Walter Craig and Philippe Guyenne. (Received September 24, 2012)