

Abstract Submitted
for the DFD09 Meeting of
The American Physical Society

Internal-Tide Scattering by 2D Topography: Experimental Study

MATTHIEU MERCIER, Ecole Normale Supérieure de Lyon, Laboratoire de Physique, THOMAS PEACOCK, Massachusetts Institute of Technology, Department of Mechanical Engineering, THIERRY DAUXOIS, Ecole Normale Supérieure de Lyon, Laboratoire de Physique — Scattering of internal tides is an important mechanism to understand mixing and energy transfer in the ocean. Numerical and oceanographic studies have shown that topographies can be responsible of conversion from low modes to higher modes, leading to transfer from large to smaller scale inducing local mixing and higher damping rate along propagation. To understand and quantify more precisely this mechanism, we generate a mode-1 internal tide using a new configuration for the wavemaker recently developed by Gostiaux *et al.*. Experiments have been realized at the Coriolis Turntable in Grenoble (France), a cylindrical rotating tank of 13 m diameter. The velocity fields observed using PIV technique are analyzed in terms of modal decomposition. Knowing that 97% of the generated internal tide energy flux is associated to a mode-1 internal tide, we analyze its interaction with a 2D gaussian topography. Subcritical and supercritical bathymetry are considered according to the frequency of the incoming internal tide. Estimations of the amount of reflected energy by the topography, such as the scattering into higher modes of the transmitted wave field, are in good agreement with numerical predictions.

Matthieu Mercier
Ecole Normale Supérieure de Lyon, Laboratoire de Physique

Date submitted: 08 Aug 2009

Electronic form version 1.4