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Harmonic Generation of Internal Waves Reflected from a Slope[1]
BRUCE RODENBORN, Centre College, DANIEL KIEFER, Center for Nonlinear Dynamics, University of Texas at Austin, HEPENG ZHANG, Jiao Tong University, HARRY L. SWINNEY, Center for Nonlinear Dynamics, University of Texas at Austin — Internal wave reflection from a uniform sloping boundary is often analyzed using linear or a weakly nonlinear inviscid theory.[2] Under these assumptions for a linearly stratified fluid, Thorpe[3] and Tabaei et al.[4] derived predictions for the boundary angle where second harmonic generation should be most intense. We previously conducted experiments and simulations that found the angle that maximizes second harmonic generation is given instead by an empirical geometric relationship between the wave beam and boundary angles.[5] We used integrated kinetic energy as a measure of beam intensity, but the method of Lee et al.[6] determines the energy flux of the second harmonic wave in the experiments. We compare results using this new method to weakly nonlinear theories and our empirical prediction.

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[6]Frank M. Lee, M. S. Paoletti, H. L. Swinney, P. J. Morrison. arXiv:1401.2484.

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