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Energy Dissipation when Internal Wave Beams Reflect from a Slope BRUCE RODENBORN, Centre College, DANIEL KIEFER, Center for Nonlinear Dynamics, University of Texas at Austin, HEPENG ZHANG, Jiao Tung 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[1]. Under these assumptions for a linearly stratified fluid, Thorpe[2] and Tabaei et al.[3] 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[4]. In the previous study, we used integrated kinetic energy as a measure of beam intensity. We compare these results with a method using energy flux. We also study the energy flux into and out of a surface above the reflection region $E_{\text{out}}/E_{\text{in}}$ and find high rates of energy dissipation $O(90\%)$. The rates remain high even for weakly nonlinear wave beams and with the viscosity reduced by an order of magnitude.

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