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Measuring Energy Dissipation in Reflecting Internal Waves using PIV Data VRINDA DESAI[1], BRUCE RODENBORN, Centre College — We previously conducted experiments and simulations that tested weakly nonlinear theories (Rodenborn et. al., Phys. Fluids, 2011) of internal wave reflection from a sloping boundary. In the previous study, we used integrated kinetic energy as a measure of internal wave beam energy. However, we use an algorithm by Lee et al. (Phys. Fluids, 26, 2014) to determine the energy flux of internal waves in our experiments using velocity field (PIV) measurements. We find good agreement between our laboratory data and our numerical simulations, where the energy flux is determined from the velocity and pressure fields. We also calculate the rate at which energy is dissipated in the reflection process by finding the energy flux into and out of a surface above the reflection region Eout=Ein. We find high rates of energy dissipation O(90%) near the critical angle in both experiments and simulations. High dissipation at the critical angle occurs in our simulations even for weakly nonlinear wave beams and when the viscosity reduced by an order of magnitude, which implies that dissipation may be relevant to internal wave reflection in the ocean.

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Vrinda Desai
Centre College

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