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Measuring Energy Flux using PIV Data[1] CLAYTON BELL, WANG-DONG (EDWARD) JIA, CHARLOTTE MABBS, BRUCE RODENBORN, Centre College — Determining the energy flux of an internal wave from the experimentally measured velocity field was made possible by the work of Lee et al. (Lee et al., Phys. Fluids, 26, 2014). This method is used in our work to measure the amount of energy dissipated when internal waves reflect from sloping boundaries by comparing the incoming energy flux to the outgoing energy flux through a surface near to the reflection region. We also use numerical simulations of the Navier-Stokes equations in the Boussinesq limit where the energy flux is known from the pressure and velocity fields. There is good agreement between our experimental and numerical simulation data, and we find that there are high rates of energy dissipation during reflection process at the critical angle when the boundary flows are strongest. The results are consistent with Dettner et al. (Phys., Fluids, 25, 2013) who showed that strong boundary flows are excited by tidal motion over model topography, but the conversion of tidal energy into internal waves is weak.

[1]Louis Stokes Alliances for Minority Participation

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