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Internal gravity wave generation by isolated topography in the laboratory: Limitations of linear theory REBECCA W. DELL, MIT/WHOI Joint Program in Oceanography, MICHAEL D. PATTERSON, Physics & Geophysics, Yale University, C.P. CAULFIELD, BP Institute & DAMTP, University of Cambridge, STUART B. DALZIEL, DAMTP, University of Cambridge — The internal wave field associated with steady flow past stationary isolated obstacles is studied in the laboratory in a recirculating stratified shear flume tank. The complete steady span-wise averaged wave field is determined using the synthetic schlieren technique. Typically, the obstacles are two-dimensional segments of cylinders, which are chosen in an attempt to satisfy the requirements for linear behaviour in the wave field. Such obstacles are predicted by linear theory to induce a steady (in the obstacle frame) lee wave field, with perturbations localized above, and slightly downstream of the obstacle, thus implying a relatively small dominant value of the streamwise wavenumber component. This is unsurprising, as the linear spectral response to an isolated obstacle is strongly peaked at small streamwise wavenumbers. Although there are many points of similarity between the observed and predicted wave fields, there are several non-trivial differences, in particular associated with the dominant beam angle for the lee waves, and also a clear decay in amplitude with distance from the obstacle. Possible reasons for these discrepancies will be discussed.

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