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Comparison of Internal Wave Kinetic Energy Estimates in Synthetic Schlieren and Particle Image Velocimetry[1] KYLE HAKES, ALLISON LEE, ANNIE WESOLEK, JULIE CROCKETT, Brigham Young University — Synthetic Schlieren (SS) and Particle Image Velocimetry (PIV) are commonly employed experimental methods for investigating internal wave generation and propagation. PIV allows direct calculations of velocity and therefore kinetic energy, but at a relatively high setup cost. SS is a less expensive experimental method that is generally more easy to implement, but is not a direct measurement of velocity but instead natural frequency changes. This can be used to estimate kinetic energy but calculations are subject to the WKB approximation. Experiments were performed to investigate when the kinetic energy estimates from SS are a good approximation of the kinetic energy calculated from PIV for the same experiment. Internal waves generated by tidal flow over 4 different topographies in 4 different density profiles are explored via both SS and PIV methods for comparison. Preliminary findings indicate SS and PIV match well overall far from regions where WKB assumptions fail, and show that their ability to generate similar results depends on the shape of the topography and density profile.

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