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Tidal conversion by a periodic array of ridges[1] LIKUN ZHANG, MATTHEW PAOLETTI, HARRY SWINNEY, University of Texas at Austin — The generation of internal waves by tidal flow over submarine topography such as ridges is the main source of internal tidal energy in the oceans. For multiple ridges the dependence of the radiated power on the ridge height and slope is different from that for an individual ridge, and for multiple ridges the power also depends on the spacing between the topographic features. Prior numerical and analytical studies on tidal generation by a periodic array of steep ridges suggest the possible saturation of conversion rate when the dimensionless height of the topography is large [S. Khatiwala, Deep-Sea Res. (2003); J. Nycander, J. Fluid. Mech. (2006); N. J. Balmforth and T. Peacock, J. Phys. Ocean. (2009)]. Here we perform 2D Navier-Stokes simulations and laboratory experiments on the generation of internal tides from a periodic array of supercritical barriers. We determine how the radiated power and saturation depend on the tidal flow, topography, and stratification.

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