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Lensing of Oceanic Gravity Waves: Theory and Experiment MOHAMMAD-REZA ALAM, RYAN BLAKE ELANDT, MOSTAFA SHAKERI, Univ of California - Berkeley — In this talk we show that small features embedded to the seafloor can result in a lensing effect for overpassing oceanic surface waves, similar to how glass lenses focus or defocus light. These seafloor features are typically in the shape of curved periodic sandbars, and the effect is a result of a nonlinear interaction between surface waves and seabed undulations which is known as "Bragg Resonance." We further show that for a broadband incident wave spectrum (i.e. a wave group composed of multitude of different-frequency waves) a polychromatic topography (occupying no more than the area required for a monochromatic lens) can achieve a broadband lensing effect. Gravity wave lenses can be utilized to create localized high-energy wave zones (e.g. for wave energy harvesting or creating artificial surf zones) as well as to disperse waves in order to create protected areas (e.g. harbors or areas near important offshore facilities). In reverse, lensing of oceanic waves may be caused by natural seabed features and may explain the frequent appearance of very high amplitude waves at certain bodies of water.

Mohammad-Reza Alam
Univ of California - Berkeley

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