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Manipulating Effective Gravity and Trapping Shallow Water Waves AHMAD ZAREEI, MOHAMMAD-REZA ALAM, University of California, Berkeley — A perfect manipulation of water waves in shallow water using transformation media methods usually requires changes in both water depth and gravitational acceleration as medium properties; however gravitational acceleration is always a physical constant. Reduced models and conformal transformations are used to keep the gravitational acceleration as a constant at the cost of performance and restriction of use. Here we present a novel method of changing effective gravitational acceleration using a visco-elastic bottom topography. This method of manipulating effective gravitational acceleration, beside changes in bottom topography, opens new applications toward controlling surface waves and enables perfect manipulation of water waves in a broad range of frequencies. Using the visco-elastic bottom topography, we present a GRIN-lens based wave-guide that traps water waves in a region along the axis of the lens. The presented method of manipulating effective gravitational acceleration can as well be applied to perfectly focus and rotate the waves for energy harvesting applications.

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