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Water wave propagation over a controlled bathymetry[1] PHILIPPE PETITJEANS[2], PMMH - ESPCI, AGNS MAUREL[3], Institut Langevin, VINCENT PAGNEUX[4], LAUM, TOMASH BOBINSKI[5], PMMH - ESPCI — An experimental study concerning the usage of metamaterials for water waves control is presented. Two applications are considered: Firstly, we show how to focus water waves using analogy to a group of metamaterials called epsilon-near-zero. The second considered application of metamaterials for water waves is hiding (cloaking) defects in a waveguide from the far field observer. The efficiency of bathymetry is evaluated in term of scattering properties. The influence of water wave dispersivity on the cancellation of scattering is also determined. Cloaking properties of the obtained bathymetry is experimentally confirmed using a wave packet characterized by broadband spectrum. In the second part, we show how to cloak a cylinder that is shifted from the centerline of a waveguide. Smooth cloaking bathymetry surrounding a cylinder is able to significantly reduce the scattering in broad range of frequencies. The experimental counterparts confirmed increase in transmission with respect to a reference case with flat bathymetry.

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