

Abstract Submitted
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Radiation and diffraction of surface waves by an oscillating water column RAMIRO GODOY-DIANA, PABLO COBELLI, STÉPHANE RAKOTO-ANDRIANTSILAVO, PMMH UMR7636 CNRS; ESPCI ParisTech; UPMC; Université Paris Diderot — An oscillating water column (OWC) modelling a wave energy converter is studied in a small scale laboratory experiment. The system consists of a cylindrical duct partially submerged in a wave tank. The water surface elevation inside the duct oscillates in response to the forcing imposed by an external wave field. The oscillation amplitude inside the duct is maximized when a resonance condition is attained. From a wave energy conversion point of view, the physical phenomena limiting the amplitude of the oscillations can be viewed as energy losses, and they can be mainly classified in friction losses inside the duct, losses due to vortex formation around the duct mouth, and losses due to radiation of surface waves produced by the OWC. Here we study the wave field around the half-submerged duct using a 2D profilometry technique, which permits an accurate measurement of the free surface height over a large field of view. We characterize the radiation and diffraction wave fields as a function of the detuning of the monochromatic forcing wave to the resonance frequency and give an estimate of the energy losses due to radiated waves.

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