

Abstract Submitted
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Scattering of axisymmetric capillary waves on a liquid cylinder by a pair of surface-pinning rings and the relation to liquid-bridge resonance¹

DAVID THIESSEN, LIKUN ZHANG, Washington State University — We consider the scattering of time-harmonic axisymmetric capillary waves on an infinite inviscid liquid cylinder by two infinitesimal coaxial surface-pinning rings. A semi-analytical solution is obtained by solving the truncated system of equations based on an evanescent wave expansion. The computations find that there is an infinite set of discrete frequencies at which the transmission is total, and these frequencies are shown to correspond to the resonant frequencies of the liquid bridge that spans the rings. These frequencies are close to the resonant modes of an inviscid liquid bridge between two impenetrable disks. An approximate solution is also obtained for the case of widely spaced rings using single-ring scattering properties. The extension of the approximate method to the computation of capillary mode resonances for other geometries will be discussed.

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