Abstract Submitted
for the OSF07 Meeting of
The American Physical Society

Anisotropic capillary wave propagation in a ripple tank[1] DANIEL VELAZQUEZ, DANIEL CROWDER, JON LINVILLE, THOMAS WILSON, Marshall University — A preliminary study has been undertaken to demonstrate the anisotropic wave propagation of capillary waves in a water ripple tank. We have fabricated, using a computer-controlled milling machine, a contoured surface upon a 12" square, ½" thick Plexiglas plate with gradually deepened (∼4 mm) angular channels emanating from the center of the plate and spaced every ninety degrees, with an additional cylindrical well in the plate's center, to accept the vibrating ball of the wave generator. The plate is submerged in the ripple tank, with the cylindrical well aligned with the point source (ball), and the water level adjusted such that the minimum and maximum water depths are 2 and 6 mm respectively and resulting wavefronts have been photographed. Provided the difference between the minimum and maximum of the phase velocities (∼17, 23 cm/s) for the corresponding depths (2 and 6 mm) of the capillary waves, can be made appropriately large (∼25%) at a fixed frequency (∼5 Hz), then one would expect to observe interesting folds ('caustics') in the wavefront in the directions of largest phase velocity (along the channels), corresponding to zero-curvature inflection points in the slowness surface. (See J.P. Wolfe "Phonon Imaging" (Cambridge University Press, 1998)). We have observed anisotropic wavefronts but as yet, no evidence for the expected folds.

[1]Support provided by NSF ECCS 0622060.

Thomas Wilson
Marshall University

Date submitted: 01 Oct 2007 Electronic form version 1.4