Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

Capillary Korteweg-de Vries solitons on a levitated cylinder[1] CHI-TUONG PHAM, LIMSI, CNRS & Universite Paris-Sud, STEPHANE PERRARD, CHARLES DUCHENE, Laboratoire MSC, Universite Paris-Diderot, LUC DEIKE, Laboratoire MSC, Universite Paris-Diderot, and Scripps Institution of Oceanography, UCSD — A water cylinder is deposited on a straight channel heated far above boiling temperature so that the water levitates above its own vapor owing to Leidenfrost effect. Our setup allows us to study the one-dimensional propagation of surface waves. We show that the dispersion relation of linear waves follows that of gravity-capillary waves under a dramatically reduced gravity (up to a factor 30), yielding an effective capillary length larger than one centimeter. Nonlinear capillary depression solitary waves propagate without deformation and undergo mutual collisions and reflections at the boundaries of the domain. Their typical width and their amplitude-dependent velocity are in very good agreement with theoretical predictions based on Korteweg-de Vries equation.

[1]Supported by ANR-11-BS04-001-01 (FREEFLOW project).

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Date submitted: 31 Jul 2014 Electronic form version 1.4