

Abstract Submitted  
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**Theoretical modeling of surfers on a vibrating bath**<sup>1</sup> ANAND OZA,  
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DANIEL HARRIS, Brown University — We present a theoretical investigation into  
the dynamics of capillary-scale objects surfing on their own self-generated wave field.  
Our study is motivated by a newly discovered system consisting of superhydrophobic  
objects floating on a vertically vibrating fluid bath. Experiments have demonstrated  
that such “surfers” propagate along the fluid interface, and that multiple surfers may  
self-organize through their wave-induced interactions. Our theoretical model con-  
sists of coupled equations for the surfers’ positional and orientational dynamics, in  
which a surfer is modeled as a source of capillary waves. The model predictions ex-  
hibit good agreement with experimentally observed interaction modes between two  
surfers. Generally, this work shows that the surfer system is amenable to quantita-  
tive theoretical modeling, and thus constitutes a promising platform for constructing  
and validating new theories of interfacial active matter.

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