Physical Mathematics Seminar

HYDRODYNAMIC WAVE-PARTICLE DUALITY

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ABSTRACT:

Millimetric liquid droplets can walk across the surface of a vibrating fluid bath, self-propelled through a resonant interaction with their own guiding wave fields. By virtue of the coupling with their wave fields, these walking droplets, or 'walkers', extend the range of classical mechanics to include certain features previously thought to be exclusive to the subatomic, quantum realm. In this talk, we will combine experiments, simulations and theory to discuss (1) the mechanism for orbital quantization in a rotating frame, (2) the emergence of spin waves in hydrodynamic spin lattices, and (3) the absence of diffusion of a walker over a random topography.

BIO: Pedro is an Assistant Professor and the director of the Physical Mathematics Laboratory (www.pml.unc.edu) in the Department of Mathematics at UNC Chapel Hill. From 2015 to 2019, he was an Instructor in Applied Mathematics at MIT. Pedro received his Ph.D. from the University of Edinburgh in 2014, and was a post-doctoral fellow at Imperial College London in 2015. His research blends experiments, numerical simulations and theory to address fundamental problems that find motivation in physics and engineering.

TUESDAY, NOVEMBER 29, 2022
2:30 PM – 3:30 PM
Building 2, Room 449

https://math.mit.edu/sites/pms/

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