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## Non-quantum wave-particle duality

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**ABSTRACT:** Walking drops are one of the rare examples of non-quantum wave-particle duality. A series of striking experiments with one walking drop has led to behaviors that were thought to be peculiar to the quantum scale. I will introduce the system and will review the most striking experimental results that have been observed so far, including macroscopic diffraction, tunnelling, and quantized dynamics in confined geometry. Finally, I will present a recent investigation involving the coupling of two walking drops. To our great surprise, we have found that the statistical behaviors of this system shares some unexpected features of collective emission of photons in quantum optics. This result is very intriguing as the quantum counterpart is the signature of non-separable states which, in our case, is the result of a collective wave self-organisation.

### Short BIO:

I am a theoretical physicist and work at ESPCI Paris -PSL as a CNRS researcher. My research is carried out in the laboratory Gulliver. I combine numerical, theoretical and even sometimes experimental approaches to investigate the physics of self-organization in complex systems including:

- Programmable active matter
- Metamaterials
- Design of polymer systems
- Waves and memory



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