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# Discharge dynamics controls the liquid-solid contact electrification of a bouncing drop

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## Résumé

A drop impacting on a superhydrophobic surface acquires an electrical charge. The magnitude of this charge depends both on the hydrodynamics of the impact and on the physicochemical properties of the liquid. The motivation for our study is two-fold: fundamental for understanding the mechanisms at play in liquid-solid contact electrification, applicative to enhance or limit triboelectric charging for producing triboelectric nanogenerators or microelectronic devices. Here, we set up a robust experimental protocol to measure the charge acquired by an impacting drop and perform a parametric study by varying drop size, impact speed, salt concentration, viscosity and liquid conductivity. Our results for pure water droplets confirm that the contact surface area is the dominant hydrodynamic control parameter for charge acquisition, but drops with varying chemical composition stray away from the predicted trends. We then demonstrate that the amplitude of acquired charge depends directly on a coupling between electric charge transport and hydrodynamic parameters, and more specifically on the ratio of the hydrodynamic impact time and the electrical discharge time.

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