Abstract Submitted
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The slow electric discharge of charged drops[1] MARTIN BRANDENBOURGER, F.R.S.-FNRS, CESAM-GRASP, Physics Department, University of Liege, PIERRE-BRICE BINTEIN, CESAM-GRASP, Physics Department, University of Liege, STEPHANE DORBOLO, F.R.S.-FNRS, CESAM-GRASP, Physics Department, University of Liege, GRASP TEAM — The presence of an excess electric charge in droplets is commonly used to justify unexpected behaviors. Although the charging mechanism of droplets is well understood, the charge loss of droplets is still debated. Previous research showed that drops only in contact with ambient air lose their charge by two different phenomena, the charge evaporation and the Coulomb explosion. These two processes are supposed to occur for highly charged droplets or very small (micrometric) droplets. In this context, we studied the charge over time for millimetric drops charged under the Coulomb explosion limit. These charged drops were stored on a vibrating bath, which allowed to keep them only in contact with ambient air. The charge of the droplets was measured by dropping them in a Faraday cup. Thanks to these measurements, we highlighted a new charge loss mechanism for charged droplets. This new mechanism occurs on a long time scale (several minutes) contrary to other charge loss mechanisms. The droplet charge loss is found to be dependent on the droplet initial charge, but independent on the liquid composition and the bouncing mode. A model corresponding to the charge loss of a capacitor correctly adjusts our observations.

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