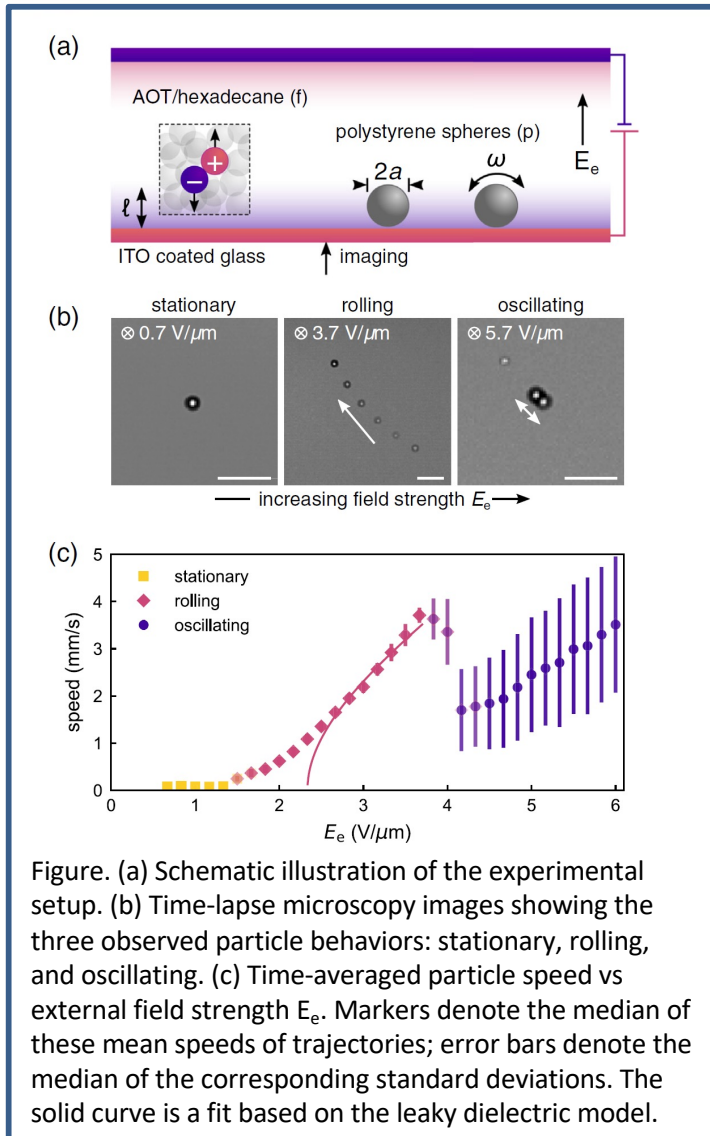


Oscillators controlled with external electric fields

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Scientific Achievement

We demonstrated that micron-size particles exhibit oscillatory dynamics in nonpolar, weak electrolytes via a field-induced boundary layer which size was computed to be commensurate with the size of the particles.

Significance and Impact

This work enables the design of colloidal oscillators and opens opportunities to investigate collective behavior in active systems and to design swarming colloidal robots.

Research Details

The spontaneous oscillations of colloids under strong electric fields in proximity to a planar electrode was studied by combining the traditional Quincke rotation mechanism with new couplings introduced by the conductivity gradient within the field-induced boundary layer. The asymmetric charging within the electric boundary layers results in particles' oscillations in the absence of inertial effects.

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