



Wolfson Department of Chemical Engineering Seminar

Monday, April 13th, 2026 at 13:30

Zoom: <https://technion.zoom.us/j/95602418338>

Measurement of dynamic electrokinetic effects at the glass/electrolyte interface using a mega-Hertz-level mechanical wave

Yifan Li

PhD Final Seminar

Advisor: Prof. Ofer Manor

Department of Chemical Engineering, Technion-Israel Institute for Technology

Surface acoustic waves are versatile in manipulating and sensing liquid or particles within fluid at the micro- to nanoscale. By measuring the out-of-equilibrium electrical double layer (EDL) leaks an electrical field, we capture the dynamic electrical properties of a spontaneously charged (electrified) glass surface in an electrolyte solution when excited with a MHz-range surface acoustic wave (SAW) actuator. The SAW drives oscillations of the ions within the nanometer-thick EDL at the glass/electrolyte interface, producing a measurable electric field that reflects the ions' dynamic motion. Employing a chirped interdigital transducer SAW actuator to sweep across multiple frequencies, we obtain an electrical-field leakage spectrum that yields the ions' dynamic relaxation times in the EDL. Specifically, the leaked field peaks when the SAW frequency coincides with an ion's characteristic frequency (the inverse of its relaxation time). Measurements across various electrolytes and mixtures reveal relaxation times for individual ionic species as well as the coupled dynamics of oppositely charged ions.