

Physical Chemistry Seminar

Wednesday, April 20, 2022
@ 12:30PM Virtual via Zoom



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“An Electro-Optical Trap for Polar Molecules: Properties and Applications”

Abstract:

An electro-optical trap (or tweezer) for polar molecules, realized by embedding an optical trap within a uniform electrostatic field, offers significant advantages over an optical trap that include an increased trap depth, conversion of alignment of the trapped molecules to marked orientation, as well as dipolar shielding, i.e., suppression of inelastic and reactive collisions. The workings of the electro-optical trap will be explained in terms of the eigenproperties of the polar and polarizable molecules subject to the combined permanent and induced electric dipole interactions at play. The electro-optical trap/tweezer (and/or their arrays) may facilitate some applications of molecular trapping, especially of quantum computing and simulation and collision stereodynamics that distinguishes between heads versus tails in molecular encounters. The added electrostatic field may also decouple hyperfine levels and thereby prolong the rotational coherence times achieved so far in an optical field alone.