Abstract Submitted
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Non-adiabatic dynamics in the detachment continuum of radical anions JAN VERLET, Durham University — Using photoelectron (PE) spectroscopy at a range of photon energies above the detachment threshold of a radical anion, the dynamics of resonances can be identified by the appearance of various channels. These include: (i) direct and prompt autodetachment, which appears in the PE spectra at energies that increase linearly with photon energy; (ii) delayed autodetachment, which is shifted to lower kinetic energy and typically does not shift with photon energy; and (iii) thermionic emission from the radical anion ground state which appears as an exponential decay at low very low kinetic energy. Using time-resolved PE spectroscopy, the non-adiabatic dynamics leading to the formation of the ground state anion can be monitored in real time. In some cases, these dynamics occur on timescales that vastly out-compete autodetachment, even at energies of 3 eV above the neutral. The methodology has been applied to a number of quinone-related molecules and provides insights into how electron capture can lead to stable anions, which is of relevance in electron transfer reactions and astrophysics.

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