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Fluctuation capture in dense gases and liquids - trapping, detrapping and non-equilibrium transport DANIEL COCKS, RON WHITE, James Cook University — When charged particles travel through a background of a dense gas or liquid the correlations in the fluid significantly modify the transport of the charged particle. In particular, a new process becomes available, in which the particle is captured into a local fluctuation (bubble or cluster) of the fluid. The trapping has an influence on all transport coefficients, especially annihilation rates of positrons and positronium. Understanding fluctuation capture is important in medical diagnostics, therapy and particle detectors in the low-energy regime, but has so far been unable to be accounted for in transport simulations. We present a new framework that produces energy-resolved "capture cross sections" $\sigma_{\mathrm{cap}}(\epsilon)$ along with "waiting time distributions" $\Theta(t)$ which allow transport theories to include capture as a process. We demonstrate good agreement between our ab initio calculations and experimental measurements of electrons and positrons in dense noble-gas fluids.

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