Electron Energetics in Near Critical Point Fluids

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As a fluid approaches its critical density and temperature, the correlation length of the individual atoms (or molecules) in the fluid becomes essentially unbounded. Thus, strong particle/particle correlations can arise in a system of weak particle/particle interactions. This increase in correlation length leads to an increase in the local density of the fluid. A collaborative effort with Dr. Gary L. Findley over the last ten years, using data obtained at the Synchrotron Radiation Center, has shown that this increase in local density yields important and novel variations in the energy of the quasi-free electron and in the energy of excited states in dense atomic and molecular fluids. Recently, we have begun to investigate the relationship between the energy of the quasi-free electron in a fluid and the drift mobility of the electron through the fluid in order to develop a more nuanced understanding of electron energetics in fluids. In this talk, we will present a summary of the last ten years of experimental and theoretical work on the quasi-free electron energy in near critical point fluids and show preliminary results for electron mobility in these same systems.