

“Hot Brownian motion”

Klaus Kroy, Ph.D.

Professor, University of Leipzig

[Abstract]

The classical theory of Brownian motion rests on fundamental laws of statistical mechanics, such as the equipartition theorem and the fluctuation-dissipation theorem, which do not hold under non-isothermal conditions. I will discuss the generalized fluctuation-dissipation relations and Langevin equations governing non-isothermal Brownian motion, including some explicit results for the frequency-dependent noise temperature and Brownian thermometry in dense liquids and rarified gases, far from equilibrium. I will also review recent experimental applications involving hot Brownian particles, such as photothermal correlation spectroscopy, photon nudging, and hot microswimmers.

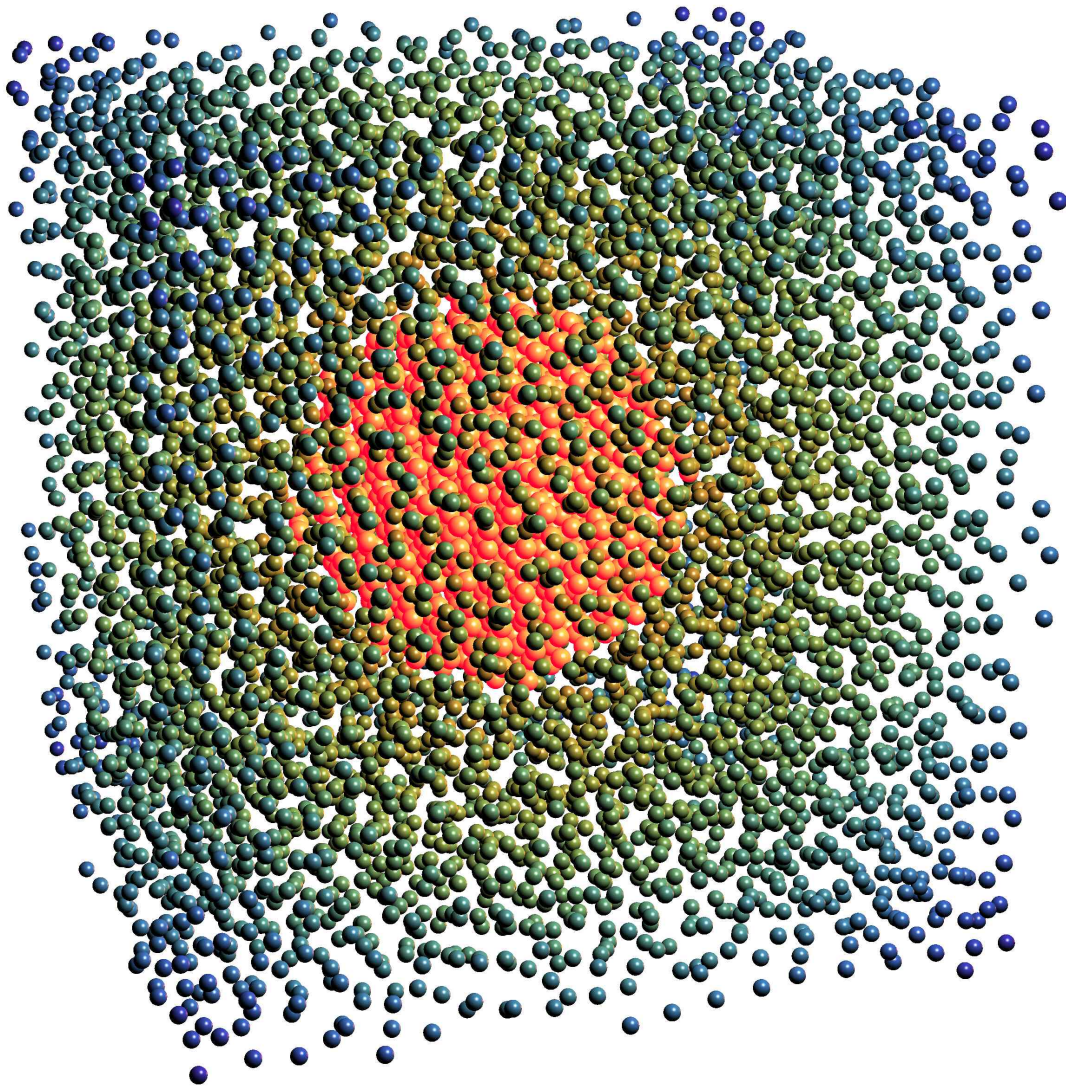


Figure: A hot nanoparticle in a Lennard-Jones fluid