

Mahmoud DarAssi

Title: Soret-driven convection in colloidal suspensions

Abstract: The effect of sedimentation and thermophoresis on the threshold conditions for the onset of convection is represented by an experimental parameter, β , which is introduced by Chang et. al. (2008). The experimental setup showed that, β , is a function of the particle radius, r_p . The graph of $\beta(r_p)$ is approximately an inverted parabola with two zero crossings in the range $5\text{ nm} \leq r_p \leq 125\text{ nm}$. We conducted both linear and weakly nonlinear stability analyses for both dilute and moderately concentrated cases. The analysis focuses on the particle dominated convection regime, for which the onset is steady, and to disturbances having infinitely long wave-length. We put forth stability criteria as functions of relevant parameters and compare them with those obtained through the binary mixture formalism.