Abstract Submitted
for the DFD20 Meeting of
The American Physical Society

**Rayleigh-Benard convection in non-colloidal suspensions**[1] PARISA MIRBOD, CHANGWOO KANG, University of Illinois at Chicago, HARUNORI YOSHIKAWA, Universite Cote d'Azur — This study explores the Rayleigh-Benard convection in suspensions of neutrally-buoyant, non-colloidal suspensions confined between horizontal walls. A constitutive diffusion equation is used to model the dynamics of the particles suspended in a viscous fluid. We employ a simple model for the effective thermal diffusivity of suspensions that considers the thermal diffusivity increasing linearly with the thermal Peclet number ($Pe$) and the particle volume fraction ($\phi$). We perform both linear stability analysis (LSA) and direct numerical simulation (DNS) for various bulk particle volume fractions ($\phi_b$) ranging from 0 to 0.3. The critical Rayleigh number ($Ra$) grows gradually by increasing $\phi_b$ from the critical value for a pure fluid, whereas the critical wavenumber ($k_c$) remains constant at 3.12. The transition from the conduction state is subcritical (or hysteretic) and the heat transfer rate in dense suspensions is significantly enhanced by the convective flow for small $Ra$ close to the critical $Ra$. We also found a power-law increase of the Nusselt number ($Nu$) with $Ra$ where the scaling exponent $b$ decreases with $\phi_b$

[1]National Science Foundation award 1854376 and Army Research Office award W911NF-18-1-0356.

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Date submitted: 06 Aug 2020 Electronic form version 1.4