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Percolation and local density fluctuations for a Colloidal System with competing interactions NESTOR VALADEZ-PEREZ, NIST Center for Neutron Research and Science and Engineering Division, University of Guanajuato, YUN LIU, NIST Center for Neutron Research and Department of Chemical and Biomolecular Engineering, University of Delaware, RAMON CASTANEDA-PRIEGO, Science and Engineering Division, University of Guanajuato — The gelation is believed to result from the particle aggregation in a complex structure. The aggregate span in the entire volume gives it a capability for supporting stresses. Gelled systems possess a high degree of inhomogeneity, while locally the particles and their near neighbors present a defined array as can be seen in their coordination number and bonding angles. Using Monte Carlo simulations, we investigate the structure of a system of hard spheres interacting through a combined potential: a short-ranged Square Well (SW) and a long-ranged repulsive Yukawa potential (RY). We made an exhaustive study for several conditions of temperature (T*) and concentration (φ) corresponding to different repulsion strengths (A). Our results show that the percolation threshold is shifted to lower concentrations when the repulsion is increased, but this shift gradually disappears at low temperature. Besides we also computed the local density through the system; we particularly identified a length scale at which the density fluctuations are attenuated. This length coincides with the intermediated range order recently identified in protein systems.

Nestor Valadez-Perez
NIST Center for Neutron Research and Science and
Engineering Division, University of Guanajuato

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