

Abstract Submitted  
for the MAR07 Meeting of  
The American Physical Society

**Structure of highly packed microgel particles** ALBERTO FERNANDEZ-NIEVES, JOHAN MATTSON, HANS WYSS, Harvard University, LIDIA RODRIGUEZ-MALDONADO, University of Almeria (Spain), MANUEL MARQUEZ, Arizona State University, ENRIQUE LOPEZ-CABARCOS, University Complutense of Madrid (Spain), ANTONIO FERNANDEZ-BARBERO, University of Almeria (Spain), DAVID A. WEITZ, Harvard University — We study the structure of concentrated suspensions of ionic microgel particles. In the shrunken state, the particles are essentially charged hard spheres and crystallize at high enough volume fractions. When swollen, however, we find no signs of crystallization, as shown by light and neutron scattering experiments; this is the case irrespective of particle concentration. Instead, the scattered intensity is characterized by the presence of two distinct peaks at low and high scattering wave vectors. Surprisingly, we find that the shift of the peaks follow identical scaling laws with concentration both above and below random close packing. The scaling is different for both peaks indicating they have a different physical origin. While the first maximum seems to be related to the structure of the system, the second peak seems to arise from charge correlations inside the microgel particles.

Alberto Fernandez-Nieves  
Harvard University

Date submitted: 20 Nov 2006

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