

Abstract Submitted
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Wigner Crystals from Charge Stabilized Water in Oil Emulsions MIRJAM E. LEUNISSEN, ALFONS VAN BLAADEREN, University of Utrecht, ANDREW D. HOLLINGSWORTH, MATT SULLIVAN, Princeton University, PAUL CHAIKIN, New York University, SOFT CONDENSED MATTER GROUP COLLABORATION, PRINCETON INSTITUTE FOR THE SCIENCE AND TECHNOLOGY OF MATERIALS COLLABORATION — A drop of water shaken or sonicated in a CHB-Decalin oil mixture produces a stable emulsion of 1-100 micron scale water droplets. The interdroplet correlations indicate strong electrostatic repulsion. When the preparation is by sonication the particle size is smaller and more uniform and the water droplets arrange in a BCC structure characteristic of a Wigner Crystal. The lattice constants are up to 20 microns. We suggest that the water droplets deionize the organic solvent due to water's high dielectric constant and hydration energy. This decreases the electrostatic screening. A slight preference of the water hydration energy for different ionic species will lead to slightly larger droplet uptake of one charge over the other and will result in the droplets being charged. The amount of charging can be controlled by changing pH. Experiments with oil-water and colloids will also be discussed.

Paul Chaikin
NYU

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