

Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

The reversible freezing and melting of colloidal crystal and glass
HUA GUO, GERARD WEGDAM, PETER SCHALL, Van der Waals zeeman Institute, University of Amsterdam, T. NARAYANAN, MICHAEL SZTUCKI, European Synchrotron Radiation Facility, ESRF COLLABORATION — We present the observation of gas-liquid and gas-solid phase transitions in a close density matched system of charge stabilized polystyrene spheres suspended in the quasi binary 3-methylpyridine /H₂O/D₂O mixture. The reversible phase transitions are induced by using the temperature as control parameter. The temperature control parameter can be varied actively and accurately and applied to the same system to study the phase behaviors. The “aggregation” observed by Beysens is in reality a phase transition of the colloidal system. Density matching enables us to observe stable gas-liquid and gas-solid equilibriums. Thus the phases formed could be characterized by the measurement of the structure factor with Small Angle X-ray Scattering (SAXS): dense liquid, glass and face centered cubic (fcc) crystal.

Hua Guo
Van der Waals zeeman Institute, University of Amsterdam

Date submitted: 14 Dec 2006

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