**Phase behavior of colloids and proteins in aqueous suspensions: theory and computer simulations**

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We present a comprehensive study of the phase behavior of colloidal suspensions with short-range attractive interactions by means of Monte Carlo computer simulations and two theoretical methods, namely, a mean field approach – a discrete perturbation theory – and an advanced integral equation approach – the so called self-consistent Ornstein-Zernike approximation. The colloidal suspensions are modelled both as hard-core attractive Yukawa (HCAY) and Asakura-Oosawa (AO) fluids and a detailed comparison of the phase diagrams obtained via theoretical approaches and computer simulations for various ranges of the interactions is shown. We confirm Noro-Frenkel's extended law of scaling according to which the properties of a short-ranged fluid at a given temperature and density are independent of the detailed form of the interaction, but just depend on the value of the second virial coefficient: by mapping the HCAY and AO fluid onto an equivalent square-well fluid of appropriate range at the critical point we show that the critical temperature as a function of the effective range is independent of the interaction potential, i.e. all curves fall onto a master curve. In addition, we provide comparison with experimental data for lysozyme proteins.