

Abstract Submitted
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Critical Point of Fine Particle Plasmas and Density Fluctuations¹

HIROO TOTSUJI, Okayama Univ., Japan — We analyze thermodynamic functions of fine particle plasmas in the domain of strong coupling between fine particles. It is shown [1] that, when the coupling is sufficiently strong, we have a separation into phases with different densities and an associated critical point. When we approach the critical point, there appear enhanced density fluctuations with diverging amplitude at the critical point. We derive related phase diagrams and enhancement factors of density fluctuations in the plane of dimensionless characteristic parameters. We also discuss the combination of experimental parameters of fine particle plasmas which enables one to observe these phenomena [2]. In order to make such an observation, it is necessary to have a bulk isotropic three-dimensional system of fine particle plasmas with a very strong coupling. Though it is not easy to realize such a system on the ground, we expect microgravity experiments may provide a chance of observation. [1] H. Totsuji, *J. Phys. A: Math. Gen.* 39, 4565 (2006). H. Totsuji, *Non-Neutral Plasma Physics VI*, ed. M. Drewsen et al., AIP, 2006, p.248. H. Totsuji, *Phys. Plasmas* 15, 072111(2008). [2] H. Totsuji, to appear in *Plasma and Fusion Research*, Vol.3.

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