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Experimental conditions to realize characteristic parameters of strongly coupled fine particle plasmas: An inverse problem[1] HIROO TOTSUJI, Okayama Univ — Statistical properties of fine particle plasmas are characterized by dimensionless parameters such as strength of coupling. When the experimental conditions of density and temperatures are known, the dimensionless parameters are readily computed. However, it is straightforward to determine experimental conditions to realize a given combination of dimensionless parameters including charging condition of fine particles. In this presentation, we solve this inverse problem as much as possible analytically and give typical example by finally resorting to numerical methods[1]. The dependency of experimental conditions on various dimensionless characteristic parameters is obtained and it is shown that there exists a domain of dimensionless parameters where experimental conditions do not exist. We also analyze the dependency on species of neutral atoms. The results may be helpful to observe various phenomena related to the strong coupling between fine particles including possible existence of the critical point.

[1] Earlier results have been given in, H. Totsuji, Plasma and Fusion Research, 3, 046(2008).

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