

Abstract Submitted  
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**Comparative study on the deduction of negative ion density by using electric probes and theoretical models** SUNG KIU JOO, SOON-GOOK CHO, IN-JE KANG, MIN-KEUN BAE, JIN-WOO KIM, HYUNG-JIN KIM, KYUSUN CHUNG, Hanyang University, CEPS TEAM — Experiments were performed with DC filament plasma using Argon as background gas and SF<sub>6</sub> as electro-negative gas. Planar and cylindrical electric probes were used to measure the negative ion density. The plasma parameters found out by analyzing current-voltage characteristics curve of probes used for obtaining theoretical negative ion density. The negative ion density is obtained by using measured electron temperatures and saturation currents of positive ions and negative charges under the assumption of quasi-neutrality. Ratios of ion and electron saturation currents and electron temperatures measured by two different types of probe are parameters to deduce negative ion density by using a proposed analytical method [1]. To produce the theoretical ratio of negative ion density to that of positive ion, a kinetic model for the planar probe is also proposed with governing equations consisting of kinetic positive ion equation, Boltzmann electron equation, kinetic negative ion equation and Poisson equation, which is a modification of previous kinetic model for ions in un-magnetized plasma [2].

[1] K.-S. Chung and S. Kado, Phys. Plasmas 13, 104509 (2006)

[2] K.-S. Chung, J. Appl. Phys. 69, 3451 (1991)

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