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Investigation on measurement of effective sheath width using a cutoff probe JUNG-HYUNG KIM, DAE-WOONG KIM, Korea Research Institute of Standards and Science, SHIN-JAE YOU, Physics department, Chungnam National University, Daejeon, Republic of Korea — The plasma density is the key parameter showing electric plasma property as well as processing rate. Therefore, various diagnostic methods have been developed and researched for measuring the absolute plasma density. One of them, cutoff probe, has been developed for more accurate measurement of the plasma density. The cutoff probe is the promising diagnostics method having diagnostic advantages: high accuracy in measured plasma density, simple assumption in measurement process, and readily use and interpretation of results for diagnostics. The sheath is also an important parameter in plasma researches and applications. In this presentation, we introduce measurement method of the effective sheath width using equivalent circuit model of S21 phase spectrum of the cutoff probe. The reliability of this method was verified by investigation of the FDTD simulation and comparative experiment with calculated Child-Langmuir law sheath width from Langmuir probe data. The results show that measured sheath width has an acceptable error when it was compared with input sheath width in the FDTD simulation. Furthermore, the measured sheath width was found to be in good agreement with the floated sheath width calculated from the Child-Langmuir sheath law.

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