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The 2nd Harmonic ECR Microplasma in Narrow Closed Space for Low Pressure Conditions HIROSHI FUJIYAMA, AKIHIRO YUKISHIGE, KE YAN, MASANORI SHINOHARA, Nagasaki University, TATSUYUKI NAKATANI, Toyo Advanced Technology — Plasma generation in narrow closed space has been succeeded for the pressure of 0.01Torr and gap length of $500\mu\text{m}$ in xenon gas for the 2^{nd} harmonic Electron Cyclotron Resonance (2^{nd} harmonic ECR). Resonant confinement of electrons at the 2^{nd} harmonic ECR leads to interesting micro plasma characteristics: the higher electron density, the lower plasma potential, the lower electron temperature and the effective power absorption against with the well-known ECR plasma. PIC-MC simulation of low pressure micro plasma supported such interesting plasma characteristics obtained by the experiments and simulations. In the experiments, it was found that the typical micro plasma characteristics: the higher electron density, the lower plasma potential, the lower electron temperature became remarkable. The ionization degree for the 2^{nd} harmonic ECR plasma in the present research, showed about 10^{-3} by 2 order higher than that of PDP micro plasma.

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