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Study of the EEDF and electronic temperature through various magnetic field barriers[1] JEROME BREDIN, ANE AANESLAND, PASCAL CHABERT, LPP Ecole Polytechnique - CNRS, VALERY GODYAK, PlasmaSensors, Brookline, MA — The Electron Energy Distribution Function (EEDF) is investigated in a planar ICP source at 4 MHz, for a pressure from 1 to 100 mTorr and a discharge power from 50 to 200 W. A DC magnetic field is generated by permanent magnets. The effect of various magnetic field configurations from constant to sharp barriers are studied using spatially resolved cylindrical Langmuir probes. In all magnetic field configurations, the density decreases with the distance to the coil. The electronic temperature varies differently depending on the field configurations: i) without magnetic field, Te decreases linearly away from the coil (about 1 eV within 12 cm), ii) with a constant magnetic field, Te decreases rapidly near the antenna (about 0.5 eV within the first 1-2 cm) and remains constant when moving further away, iii) with a sharp magnetic field barrier located in the middle of the chamber body, Te decreases within the steep magnetic field gradient. These experiments show that to decrease rapidly the electron temperature, it is required to generate a strong gradient of magnetic field.

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