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Investigation on Electric Field Excitation type MWR Probe EMI KUMAZAKI, Chubu Univ., KEIJI NAKAMURA TEAM, HIDEO SUGAI TEAM — A plane-type microwave resonator (MWR) probe has been developed for electron density monitoring with less disturbance to the plasma. In a conventional case, the resonator was excited by MW magnetic field where the complex connection of the frequency-swept MW source was necessary. In this study, an electric-field-excited resonator was investigated to simplify the probe structure, and this excitation configuration was applied to a multi-resonance MWR probe for measurements of electron density and electron temperature. The probe has two slot resonators of 34 mm and 39 mm in length which are formed in a 0.1-mm-thick 28 mm square plane conductor. To excite the two resonators, only one MW-applied small rod conductor was used for one of the resonators. FDTD simulation revealed that even in such an excitation configuration, both the resonators were excited at different two frequencies of 1.88 GHz and 1.68 GHz similarly to the conventional magnetic field excitation. The resonance frequencies almost coincided with calculated ones under an assumption that the slot length is equal to a quarter wavelength of electromagnetic wave propagating the slot. These results suggested the electric field excitation enabling simple probe structure is useful for the multi-resonance MWR probe.

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