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Comparison of excitation temperature and electron temperature in low pressure argon plasmas HOYONG PARK, JUNKYU RHEE, JUNGHEE KIM, JONGSUB LEE, SEONGHUN LEE, SHINJAE YOU, HONGYOUNG CHANG, WONHO CHOE, KAIST — Compared to other active diagnostic methods, the optical emission spectroscopy (OES) method using an emission spectrum from the plasmas has a benefit of non-intrusive, in-situ monitoring of the plasmas. In this work, a study was performed to investigate the relation between the excitation temperature (obtained by OES) and the electron temperature (obtained by a Langmuir probe) in low pressure argon plasmas. In order to compare the two temperatures for various experimental conditions, argon pressure and input power were independently varied. The collection optics consisted of an optical fiber and a bi-convex lens was used for a comparison between the local values of the two temperatures. The results so far achieved in capacitively-coupled argon plasmas of which electron energy probability function was bi-Maxwellian showed that the excitation temperature had the same tendency with the high energy part of the electron temperature as the rf power and the pressure were increased. From the results, the measured excitation temperature can be used as an indicator of electron temperature variation, which may be applicable to the plasmas where non-intrusive diagnostic methods are required such as in large area plasmas for LCD plasma processes.

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