

Overview of Recent IEC Studies at Tokai University

Michiaki UTSUMI^{1*}, Nguyen Duy Thong², Takanori TOKIEDA², Takuma NISHIGAKI², Yasuyuki TANIUCHI³, Yoshihito MATSUMURA³

¹Department of Applied Science and Energy Engineering, Tokai University,

²School of Engineering, Course of Applied Science, Tokai University,

³Graduate School of Science and Technology, Tokai University

4-1-1 Kitakaname, Hiratsuka-shi 259-1292, Japan

* michiaki@keyaki.cc.u-tokai.ac.jp

Since 2005 year, we have started to study about Inertial Electrostatic Confinement Fusion (IECF). We studied low-input-power neutron source (less than 30kV and 40mA) based on the IECF concept. Recently, we have studied two themes. One is the investigation of the neutron generation region and another is the measurement of the plasma parameters in the central core of the cathode in the center-spot mode operation.

In order to investigate the neutrons generated region, two types of cathodes were employed. Spherical and cylindrical cathodes were used to measure the ratio of neutron production rates (NPR) with ^3He counter tubes at 2 places simultaneously. As the results, for HALO-mode (using spherical cathode), it seems that neutrons are produced in the cone shape region and it is confirmed that neutrons are generated at a line shape region when the cylindrical cathode was used.

The NPR may be influenced by the potential distribution in the central core of the cathode, so we want to know its distribution. We try to develop a simple and easy measurement to investigate this distribution. For the first step, we used to insert the Langmuir probe directly inside the cathode with low power supply in the center-spot mode operation. As the preliminary results, we measured the virtual anode potential by using the large radius spherical cathode. Some other plasma parameters were also determined.