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Overview of IEC Research at Tokyo Tech.

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Inertial electrostatic confinement (IEC) fusion devices at Tokyo Institute of Technology (Tokyo Tech.) fall into three categories, namely, spherical, cylindrical and coaxial double cylindrical type. The spherical device has been used for the investigation of fundamental characteristics of IEC.

For the applications of IEC to the manufacture of positron emission tomography (PET) medication, high quality semiconductor production by neutron transmutation doping, or explosive and illicit material detection, higher neutron production rate (NPR) is required. With the aim of increasing NPR, recent IEC research at Tokyo Tech. has been concentrated on the use of magnetic fields including a uniform axial magnetic field [1] or a line cusp magnetic field [2, 3] using a cylindrical IEC device. In this case, ion production near the anode or the vacuum chamber wall is anticipated.

Pulsed operation in higher discharge current region (up to 10 A) was also performed using the cylindrical or the coaxial double cylindrical device [4]. When the current was in ampere region, the discharge mode was found to be the abnormal glow, which indicates that the cathode current density is high enough for the cylindrical device.

The detailed results obtained will be presented at the workshop.

References

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