

Abstract Submitted  
for the DPP16 Meeting of  
The American Physical Society

**Development of a compact neutron source by a high voltage ring electrode discharge** MASAYUKI WATANABE, Nihon University, SHUHEI NEZU TEAM, AKIHIRO TAKEUCHI TEAM — Neutron is one of the particles in atomic nucleus. Neutron beam has many physical characteristics as follows; (a) the transmittance in a matter is high and (b) the interaction with atomic nuclei is dominant. For these reasons, the development of the neutron beam source is expected in many engineering and medical applications. However, it is still under development, because there is no compact neutron beam source. The purpose of this research is to develop the compact neutron beam source. The neutron is generated by using the inertial electrostatic confinement fusion. In this experiment, a ring-shaped electrode (cathode) is used for the convergence of the deuterium nucleus. To product the neutron by a D-D nuclear reaction, it is necessary to apply a high voltage into the glow discharge plasma. The neutron production rate is approximately  $10^5$  n/s under the condition that the cathode voltage is -15kV and discharge current is 10 mA. The neutron production rate increases with increasing the ring cathode voltage or discharge current. It will be possible to increase the number of neutrons by the stabilizing of the high voltage and high current discharge.

Masayuki Watanabe  
Nihon University

Date submitted: 08 Aug 2016

Electronic form version 1.4