

# 5. Network-Type Collaboration Research

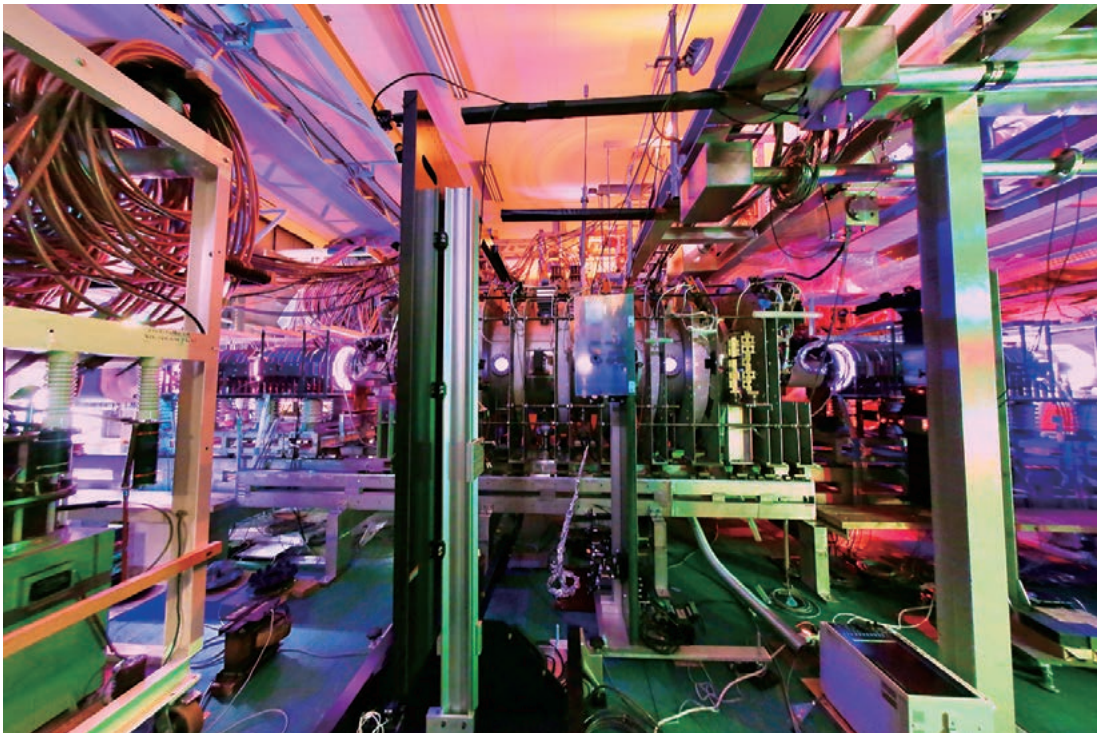
This research is eligible for research conducted by collaborating with facilities owned by the NIFS and multiple universities.

In this fiscal year, the research shown below was done. The titles and brief summaries of the research topics are listed below.

## (1) “Development of Plasma Source for Active Control in High Beta Torus Plasmas”

N. Fukumoto (Univ. of Hyogo)

The basic subjects of this collaborative research are the development of plasma sources based on the magnetized coaxial plasma gun (MCPG) method, the theta pinch-Field Reversal Configuration (FRC) method, and the rotating magnetic field (RMF)-FRC method. In this FY, studies were conducted on the development of a new type of MCPG, collisional coalescence generation of FRC, injection of CT into orthogonal magnetic fields, collisionless magnetic pump heating of FRC, the electron acceleration effect during spherical tokamak generation, and aurora simulation by CT injection.



## (2) “Study of suppression and avoidance of vertical position shift phenomena in tokamaks using three-dimensional magnetic fields”

T. Fujita (Nagoya Univ.)

In this study, the method of suppressing and avoiding a VDE (Vertical Displacement Effect), which is a problem in tokamak fusion devices during disruption, by using a three-dimensional magnetic field will be studied both experimentally and theoretically. In this FY, studies were conducted on Vertical Position Stabilization by a three-dimensional magnetic field and on the interaction between external RMP and plasma.

**(3) “Creation of plasma meta-state science”**

Y. Sentoku (Osaka Univ.)

This research aims to form a network across the boundaries of magnetized plasma, laser plasma, and plasma applications, to understand dynamically ordered structures, and to gain a new perspective on plasma physics.

**(4) “Study on tritium, radon and radium concentrations and dynamics of tritium, radon, and radium in environmental water in Japan”**

T. Sanada (Hokkaido Univ. of Science)

In this study, a wide-area continuous observation of tritium concentration in environmental water will be carried out by multiple institutions established in this network study, together with NIFS, which has a tritium precision measurement system, at the core. In addition, an analysis of radon ( $^{222}\text{Rn}$ ) and radium ( $^{226}\text{Ra}$ ), which are natural radionuclides, will be conducted to investigate the causes of fluctuation of their concentrations and their usefulness as tracers. Samples to determine tritium concentration in precipitation were collected at Hokkaido University of Science, Hirosaki University, NIFS, Kumamoto University, and the University of the Ryukyus. A measurement method for radium radioactivity concentration in water samples was developed. In addition, groundwater samples were collected from the Hirosaki city area, and radon and radium concentrations in the samples were measured.

