9. Research Enhancement Strategy Office

The Research Enhancement Strategy Office (RESO) was founded in October 2013, and three University Research Administrators (URAs) were assigned. Under the Research Planning Task Group, the following four Task Groups were organized.

(1) IR(Institutional Research)/Evaluation Task Group
(2) Public Relations Enhancement Task Group
(3) Collaboration Research Enhancement Task Group
(4) Young Researchers Development Task Group

(1) The collaborative research activities

1) Enhancing international collaborative research in the stellarator-heliotron (S-H) plasma, and steady-state operation (SSO) toward a fusion reactor

Wendelstein 7-X (W7-X) of the Max Planck Institute of Plasma Physics (IPP) at Greifswald in Germany was upgrading for the water-cooled divertor from November 2018. In 2019, several scientists of NIFS visited IPP in order to install diagnostics devices and other instruments, such as the Charge Exchange Recombination Spectroscopy (CXRS) and the fast ion detectors. Especially, a joint research between NIFS and IPP was conducted intensively for the investigation of the re-deposition layer on the fast wall of W7-X.

Collaborative research was also enhanced with PPPL and the University of Wisconsin in the United States, CIEMAT in Spain, CEA in France, CONSORZIO RFX in Italy, Culham Centre in the United Kingdom, and Peking University and Southwest Jiaotong University (SWJTU) in China. New collaboration agreement with the University of Belgrade was signed in November 2019. First workshop on the plasma physics is planned at Belgrade in 2020.

2) International research network for integrated plasma physics

In addition to the individual MoUs with Princeton University and three Max-Planck institutes (IPP, MPA and MPS), a new MoU for starting the International Research Collaboration Center for Astro-fusion Plasma Physics (IRCC-AFP) in NINS was signed.

3) Promoting establishment of Agreements with Asian institutes to accelerate collaborative research

In order to enhance helical and stellarator research in Asian countries, the Chinese First Quasi-axisymmetric Stellarator (CFQS) project between NIFS and SWJTU and an international research collaboration between NIFS and Peking University has been promoted. In the CFQS project, test fabrication of the modular coil was successfully conducted. Substantial construction of the CFQS device will start soon. As the collaboration between NIFS and Peking University, Design of the Time-of-Flight neutron spectrometer (TOFED) is completed for LHD. The construction of TOFED is initiated in 2019.

(2) Supporting young researchers

In the activities for supporting young researchers, international collaboration activities of young researchers were encouraged, enhancing their basic research skills. RESO supported the international collaboration plans proposed by young researchers in NIFS. Applications were reviewed by the Young Researchers Development Task Group. One program was supported in FY2019 as follows.

1. Experimental study of the dynamical responses of the detached plasmas with abrupt impulses of ELM type heat pulses.

In addition, RESO supported the basic research plans of young scientists for the purpose of enhancing their fundamental scientific skills. Two programs were supported in FY2019 as follows.

1. Development of the direct construction of the heat deposition profile of ECH using optical vortex measurement.

2. Study of the heat transportation through micro channel using microscope under the ultra low temperature condition.

RESO also assisted with the applications of young scientists to the 'Grants-in-aid Scientific Research' program. About 70 application documents were reviewed and suggestions were given to the authors for improvement.

(3) Enhancing public relations

1) Dissemination of research achievements through EurekAlert!

Four topics were released: i) "Fusion scientists have developed *the nano-scale sculpture technique*: ~ This enables observation inside hard materials with an atomic-scale ~," ii) "Demonstration of alpha particle confinement capability in helical fusion plasmas," iii) "Simulations demonstrate ion heating by plasma oscillations for fusion energy," and iv) "Isotope movement holds the key to the power of fusion reactions". These topics were released to the media in Japan, too. Some topics attracted attention from the international media.

2) Information release about NIFS and fusion science

RESO participated in the AAAS annual meeting and introduced NIFS and our research results to meeting participants in collaboration with other Japanese institutes, 13-16 February 2020.

3) Outreach activities based on the fusion community

One of the outreach activities is to join the organization of the ITER/BA Projects annual report meeting. RESO exhibited panels showing NIFS research activities at the meeting. RESO also joined the discussion of the fusion science outreach headquarters and contributed to the start-up of the web page of nuclear fusion by the Ministry of Education, Culture, Sports, Science and Technology.

4) Others

RESO introduced interesting science topics to the public on the occasion of the science café at the Open Campus of NIFS shown in the Figure 1.

(4) IR/Evaluation activities

The task group for the IR (Institutional Research) and evaluation continued its role to make systematic analyses of the present research activities of the institute. The statistical data of the publications and the scientific reports were collected using the NIFS article information system (NAIS) with complementary data obtained through SCOPUS and WoS public research resource supplying companies. The outcome results of the collaboration activities were collected through the annual collaboration reports of NIFS. Six IR reports were submitted to the director general of NIFS describing the analyzed academic data and proposals to improve the research management of the Institute.

Fig. 1 The science café at the Open Campus of NIFS.

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