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NIFS-SWJTUジョイントプロジェクトとして進める 準軸対称ヘリカル装置CFQSの現状
Current Status of NIFS-SWJTU Joint Project for Quasi-axisymmetric Stellarator CFQS

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National Institute for Fusion Science (NIFS) established an international academic cooperation agreement with Southwest Jiaotong University (SWJTU) in July 3rd, 2017, for moving towards the first helical plasma experimental research in the People's Republic of China [1]. NIFS and SWJTU initiated the implementation of physics and engineering designs of the new helical device called Chinese First Quasi-axisymmetric Stellarator (CFQS) collaboratively. Figure 1 shows the signing ceremony for the NIFS-SWJTU joint project. From now, the two institutes will undertake construction of the CFQS, plasma heating and diagnostics technical development, and plasma experiments jointly. The CFQS will be constructed in SWJTU. The magnetic configuration of CFQS is quite different from that of the Large Helical Device (LHD). Although the CFQS is tokamak-like in the magnetic configuration, it does not require a net plasma current to confine a high-temperature plasma as its name suggests. It is characterized by low-aspect ratio, weak magnetic shear, and significantly reduced neoclassical transport and toroidal viscosity[2-6]. A feasible divertor study is also ongoing[7]. By implementing plasma experimental research based upon a device designed using new concepts in new collaborative design and construction, we can complement experimental research performed on the LHD. NIFS is going to utilize existing resources of Compact Helical System (CHS) of NIFS effectively, i.e., vacuum pumping system, 54.5 GHz gyrotron for electron cyclotron resonance heating, and key diagnostics such as heavy ion beam probe. Relocation of a neutral beam injector of CHS is be also considered after the commissioning stage [8]. The first plasma will be achieved in 2021 if all goes on schedule.

Fig. 1 Signing ceremony for the NIFS-SWJTU joint project for CFQS on July 3rd, 2017.

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