

## **Fusion Research at SWIP in China**

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Southwestern Institute of Physics (SWIP) was established in 1965 in Leshan, China. It consists of three sub-units – Center for Fusion Science (CFS) in the Chengdu new site, Plasma Application and Plasma Technology in the downtown of Chengdu, and a college in Leshan. As the largest research base for the controlled nuclear fusion in China, SWIP developed successively the HL-1 tokamak in 1984 and the HL-1M tokamak in 1994. In December 2002, the first divertor tokamak in China - HL-2A, was put into operation. And some original research has been made at SWIP, e.g., the molecular beam fueling technique was originally proposed and applied on HL-1M tokamak, 3D zonal flow was observed on the HL-2A tokamak for the first time.

CFS consists of 8 research divisions, and there are nearly 300 staff including 107 senior researchers. The main research conducted in CFS includes plasma theory and simulation, plasma diagnostics and experimental plasma physics, fusion technology and engineering, fusion reactor design and technology, plasma surface interaction and fusion materials. On HL-2A tokamak there are about 30 diagnostic systems and three kinds of fueling systems. The auxiliary system includes ECRH (68 GHz, 2MW), LHCD (2.45 GHz, 1MW) and NBI (50 keV, 1.5 MW). The plasma parameters achieved are as follows: plasma current 400 kA,  $B_T$  2.7 T, plasma duration ~ 3 s and electron density  $6.0 \times 10^{13} \text{cm}^{-3}$ .

It is planned to modify the HL-2A tokamak in the next years in order to get more flexible and elongated divertor plasma, and the auxiliary power will be up to 10 MW. Besides, ITER-relevant research such as fusion material development and fusion reactor design is also conducted at CFS, there are 8.5 ITA tasks for SWIP.