



IAEA FEC 2014

Contribution ID: 135

Type: Poster

Physics and Engineering Studies of the Advanced Divertor for a Fusion Reactor

Friday 17 October 2014 14:00 (4h 45m)

Magnetic configurations of advanced divertor, i.e. super-X (SXD) and snowflake, were recently proposed, and the concepts have been demonstrated in experiments. For the application to the Demo reactor, engineering design as well as the plasma performance should be determined. A short super-X divertor (short-SXD) is proposed as a new option for Demo divertor, where field line length from the divertor null to the outer target was largely increased (more than two times) in a similar size of conventional divertor. Physics and engineering design studies of a fusion reactor with the short-SXD installed at the outer divertor have progressed. Minimal number of the divertor coils (1 or 2) were installed inside the toroidal field coil, i.e. interlink-winding (interlink). Arrangement of the poloidal field coils (totally 8 or 9) and their currents were determined, taking into account of the engineering design such as vacuum vessel and the neutron shield structures, and maintenance scenario of the divertor and blankets. Divertor plasma simulation (SONIC) showed that large radiation region is produced between the super-X null and the target, and the plasma temperature becomes low (1-2 eV) both at the inner and outer divertors, i.e. fully detached plasma was obtained efficiently.

Country or International Organisation

Japan

Paper Number

FIP/3-4Ra

Author: Mr ASAKURA, Nobuyuki (Japan)

Co-authors: Dr TANAKA, Hirohiko (National Institute for Fusion Science); Dr UTOH, Hiroyasu (Japan Atomic Energy Agency); Dr SHIMIZU, Katsuhiro (Japan Atomic Energy Agency); Dr HOSHINO, Kazuo (Japan Atomic Energy Agency); Dr TOBITA, Kenji (Japan Atomic Energy Agency); Mr SHINYA, Kichiro (Toshiba Nuclear Engineering Services Co.); Dr KOBAYASHI, Masahiro (National Institute for Fusion Science); Prof. OHNO, Noriyasu (Graduate School of Engineering, Nagoya Univ.); Dr TOKUNAGA, Shinsuke (Japan Atomic Energy Agency); Dr SOMEYA, Youji (Japan Atomic Energy Agency)

Presenter: Mr ASAKURA, Nobuyuki (Japan)

Session Classification: Poster 8