

## Island bundle diverter configuration for quasi-axisymmetric stellarator

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National Institute for Fusion Science, Japan and Southwest Jiaotong University, China are making collaboration in a joint project NSJP for constructing a new stellarator CFQS in China. The device design concept is based on the quasi-axisymmetric advanced stellarator. As well as good performances of confinement properties of core region, the magnetic configuration of the peripheral region is very important because the diverter performance is crucial for the successful achievement of the future reactor design. For the present stellarator experiments, two leading concepts for the diverter are well known, namely, the intrinsic helical diverter, represented by LHD in Japan, and the island diverter represented by W7-X in Germany.

For the new stellarator CFQS, we propose a new diverter concept of “Island Bundle Diverter (IBD)”. Since the diverter magnetic configuration of IBD is constructed with magnetic island structure, there is a similarity between IBD and the island diverter in W7-X. However the essential difference is a very large size of the islands surrounding the core region, which clearly define two separate confinement regions of core confinement and divertor region (Fig.1). These two regions are facing with each other through a clearly defined magnetic separatrix. Divertor field line tracing pattern shown in Fig. 2 is similar to the tokamak diverter and the connection length of field lines between the separatrix and the divertor wall is long enough (without exceptional short lines) for the good diverter performance.

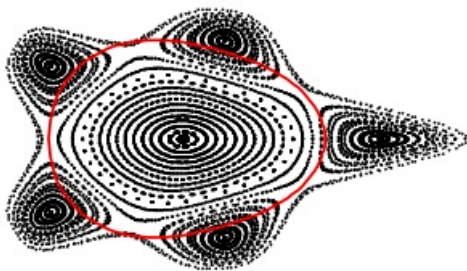


Fig. 1 Magnetic surfaces of Island Bundle Diverter

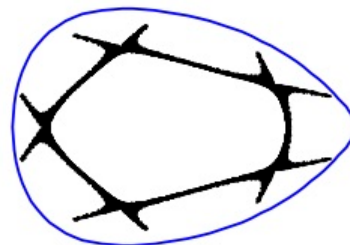


Fig. 2 Divertor tracing with vacuum chamber wall in blue