

Preliminary research on the island divertor configuration by applying 3/1 RMP in J-TEXT

Nengchao Wang¹, Y. Liang^{1,2,3}, Xiaolong Zhang¹, Jie Yang¹, Qiming Hu⁴, Song Zhou¹, Zebao Song¹, Da Li¹, Zhuo Huang¹, Linzi Liu¹, Chengshuo Shen¹, Bo Rao¹, Y. H. Ding¹ and the J-TEXT team

¹ *International Joint Research Laboratory of Magnetic Confinement Fusion and Plasma Physics, Huazhong University of Science and Technology, Wuhan, China*

² *Forschungszentrum Jülich, Jülich, Germany*

³ *Institute of Plasma Physics, Chinese Academy of Sciences, Hefei, China*

⁴ *Princeton Plasma Physics Laboratory (PPPL), Princeton, USA*

**E-mail: wangnc@hust.edu.cn*

The island divertor configuration [1] was first proposed in 1977 for tokamak. It has been established successfully in various tokamaks, e.g. TEXTOR, and stellarators [2], such as W7-AS, LHD and recently in W7-X, leading to the impurity screening effect and the heat flux reduction on the target.

In the recent campaign of J-TEXT tokamak, an experimental attempt have been made to form an island divertor configuration. An edge 3/1 island has been excited by applying the resonant magnetic perturbation (RMP) with dominate $m/n = 3/1$ component to a plasma with edge safety factor $q_a \gtrsim 3$. The 2/1 component of external RMP fields was kept at a low level to avoid exciting large 2/1 locked mode. Once the 3/1 island has been excited, the radial and poloidal profiles of the floating potential, the intensity of CIII radiation, the edge toroidal rotation varied significantly. The poloidal profiles of the floating potential measured at the limiters, varied during the formation of 3/1 island, indicating the impact of the 3/1 island on the footprints.

In addition, the preliminary design for building a set of island divertor coils utilizing 4/1 island will also be discussed.

[1] F. Karger and K. Lackner, *Physcis letters A* **61** (1977) 385

[2] R. König, et al., *Plasma Phys. Control. Fusion* **44** (2002) 2365