Contribution ID: **553** Type: **Poster**

Tungsten control in NBI-dominant H-mode discharges in EAST tokamak

Tuesday, 23 October 2018 14:00 (20 minutes)

In EAST tokamak, H-mode discharges have been obtained without a basic change at various heating conditions after installation of tungsten monoblocks at upper divertor. Recently, a reproducible long pulse H-mode operation with sufficient tungsten suppression has succeeded for both electron cyclotron resonance and lower-hybrid wave heated discharges and various experimental approaches are also attempted for the tungsten suppression. In discharges dominantly heated by NBI, however, the long pulse H-mode operation has been often restricted by appearance of the tungsten accumulation. Therefore, an exploration of experimental scenarios capable of avoiding the tungsten accumulation is urgently necessary for achievement of the long pulse H-mode discharge with NBI heated high-performance plasma. In the present work, control of the tungsten accumulation in the H-mode discharge with NBI-dominant heating is studied in EAST by measuring tungsten spectra and those radial profiles in extreme ultraviolet (EUV) range at 20-500Å.

In order to control the tungsten accumulation in NBI H-mode discharges, experiments have been done by superimposing the LHW heating. One of the experiments is carried out by changing the 4.6GHz LHW power intermittently injected in the NBI H-mode discharge. When the LHW pulse is switched on, plasma particles immediately start to pump out. The tungsten concentration is largely reduced in the plasma core, while the tungsten concentration in the plasma outer region does not change so much. Similar behavior is also observed in the radiation loss. In addition, two-dimensional radiation distribution show that the tungsten accumulates at a very narrow region in plasma core ($\rho<0.2$) during the NBI phase and considerably flattens during the LHW pulse. These results clearly indicate a change in the tungsten transport in the NBI H-mode discharge. A series of experiments are completed by changing the LHW injection power in the NBI H-mode discharge. As a result, a sufficiently reduced tungsten concentration is obtained at P_{LHW}/P_{NBI} ~1.0, e.g. by an order of magnitude. The beneficial role of LHW injection observed for the first time in EAST is very similar to results of on-axis ECRH and ICRH in ASDEX-U and JET. The tungsten transport in the present experiment is being analyzed with a simulation code.

Country or International Organization

China, People's Republic of

Paper Number

EX/P2-3

Primary author: Dr ZHANG, Ling (CnIPPCAS)

Co-authors: Prof. HU, Chundong (CnIPPCAS); Dr DING, Fang (CnIPPCAS); Dr LIU, Haiqing (CnIPPCAS); Prof. GUO, Houyang (CnIPPCAS); Prof. HUANG, Juan (CnIPPCAS); Prof. CHEN, Junling (CnIPPCAS); Prof. WANG, Liang (CnIPPCAS); Prof. HU, Liqun (CnIPPCAS); Dr LI, Miaohui (CnIPPCAS); Prof. ZANG, Qing (CnIPPCAS); Prof. MORITA, Shigeru (National Institute for Fusion Science); Prof. GONG, Xianzu (CnIPPCAS); Prof. ZHANG, Xiaodong (Institute of Plasma Physics, Chinese Academy of Sciences); Mr YANG, Xiuda (CnIPPCAS); Dr DUAN, Yanmin (CnIPPCAS); Dr LI, Yingying (CnIPPCAS); Dr LIU, Yong (CnIPPCAS); Prof. SUN, Youwen (CnIPPCAS); Prof. LIANG, Yunfeng (Forschungszentrum Jülich GmbH, Germany); Prof. WU, Zhenwei (CnIPPCAS); Dr XU, Zong (CnIPPCAS)

Presenter: Dr ZHANG, Ling (CnIPPCAS)

Session Classification: P2 Posters