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Optimization and Design of Divertor Langmuir Probe Diagnostic System on the EAST Tokamak

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A flush-mounted Langmuir probe system has been built on the lower graphitic divertor targets on the EAST tokamak in 2016, which is transformed from the previous divertor Langmuir probes, aimed to reduce the erosion from high energy particle and strong heat flux on the probe surfaces exposed in the plasma, and explore new structure application. During the 2016 EAST campaign, the flush-mounted probe system has measured the plasma parameters by using single probe and triple probes respectively, to obtain electron density, electron temperature, particle and heat fluxes, and compared with the previous domed probe in the same plasma discharge condition. The results show that the plasma parameters measured by different measuring methods or different probe shapes are basically consistent, and demonstrate the flush-mounted probe system has been successfully used as a reliable diagnostic tool in the EAST divertor. Meanwhile, the design of the divertor Langmuir probe system is put forward and discussed, for the next generation of EAST lower divertor, which will be upgraded to full tungsten divertor with active water cooling, by optimizing the successful design of the Langmuir probe system on the ITER-like top tungsten divertor and the flush-mounted Langmuir probe system.

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Eligible for student paper award?

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Author: Mr XU, Jichan (ASIPP; USTC)

Co-authors: Prof. WANG, Liang (Institute of Plasma Physics, Chinese Academy of Sciences, Hefei 230031, China); Prof. XU, Guosheng (Institute of Plasma Physics, Chinese Academy of Sciences, Hefei 230031, China); Mr FENG, Wei; Mr LIU, Huan; Mr DENG, Guozhong; Dr LIU, Jianbin; Prof. YAO, Damao; Prof. LUO, Guangnan; Prof. GUO, Houyang

Presenter: Mr XU, Jichan (ASIPP; USTC)

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