



Contribution ID: 425

Type: Poster

First measurement of LiIII charge exchange line on EAST tokamak

Wednesday 7 June 2017 13:40 (2 hours)

Lithium wall conditioning on EAST have been employed since 2009. The high performance plasma (H-mode) has been recently successfully obtained with the help of lithium coating since the autumn campaign of 2010[1]. And stationary H-mode plasmas over 30s was obtained in 2012. Lithium evaporators and real-time Li power/granules injection are used for the stationary H-mode plasma and ELMs control. One neutral beam injection (NBI) with two positive ions sources positioned at the A port has been successfully installed and running on EAST in 2014[2]. It injects a beam of deuterium atoms with an energy of 50-80keV and a power of about 1-2MW to heat and rotate the plasma. A toroidal charge exchange recombination spectroscopy (CXRS) based on the beam of A-port is developed and installed on EAST [3] at the same time. It uses a high-throughput, lens-based scanning spectrometer which can be adjusted to any wavelength between 400 and 700nm and a back-illuminated frame-transfer CCD camera with on-chip multiplication gain. On EAST, the active charge exchange lithium emission ($\lambda=516.689\text{nm}$, $n=7-5$ [4]) is firstly observed during the 2016 experimental campaign on EAST. The simultaneous measurement of CVI and Li III was performed by dropping lithium power at the same time during the 2016 EAST experimental campaign. The preliminary measurements suggest there are sufficient lithium emissions to allow for the measurement of lithium spectra when the real-time Li power is injected. In the paper, the experimental hardware is described and preliminary measurements will be shown.

[1] G.S.Xu et al., Nucl. Fusion Vol. 51, pages 072001 (2011)

[2] C.D.Hu, Plasma Sci.Technol. Vol. 17, pages 1-3 (2015)

[3] Y.Y.Li et al., Rev. Sci. Instrum. Vol. 85, pages 11E428 (2014)

[4] M.Podesta et al., Nucl. Fusion Vol. 52, pages 033008 (2012)

Eligible for student paper award?

No

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Session Classification: W.POS: Poster Session W

Track Classification: Diagnostics and instrumentation