Contribution ID: **426**                                              Type: **Poster**

# Fast-ion studies in high performance fully non-inductive discharges on EAST

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

On the EAST tokamak, one hundred seconds steady state H-mode (H98y2~1.1) discharge has been achieved by RF-only (LHW+ECRH+ICRH) heating with improvement of the auxiliary heating and current drive systems on actively cooled ITER-like mono-block tungsten divertor. Towards EAST high performance advanced state-steady operation regimes, fast-ion related physical issues become crucial for achieving EAST scientific objectives with both co-Ip and counter-Ip neutral beam injections [1]. Accordingly, EAST several complementary fast-ion measurements [2] have been developed and validated, e.g. fast-ion D-alpha (FIDA), fast-ion loss detectors (FILDs), neutral particle analyzers (NPA), neutron spectrometers and TOFED, etc. In recent experiments, compared with RF-only discharge, NBI and RF plasmas has a higher $\beta_p$ and H98y2, although the bootstrap current fraction fBS is nearly the same [3], TRANSP analysis shows that it is mostly due to fast ions, and fast ions do not contribute significantly to fBS. To obtain high performance plasma and improve confinement and transport on EAST, key related parameters (e.g. density, plasma current, beam energy, etc.) need to optimize further to reduce the fast ion slowing down time and prompt loss. To investigate fast-ion distribution function and prompt loss, different beam voltage and plasma current are investigated as well. Experimental results show that prompt loss from counter beams is large and can be reduced by reducing beam voltage and increasing plasma current, which is consistent with simulations. The relationship of the fast ion loss and distribution to the different beam settings and plasma parameters will be reported in this paper, which is very helpful to understand energetic particle physics in long pulse H-mode plasmas on EAST and contributes to ITER.

## Country or International Organization

China, People's Republic of

## Paper Number

EX/P2-15

**Author:** Ms HUANG, Juan (CnIPPCAS)

**Co-authors:** Dr WU, Chengrui (ASIPP); Dr CHANG, Jiafeng (ASIPP); Ms ZHANG, Jing (ASIPP)

**Presenter:** Ms HUANG, Juan (CnIPPCAS)

**Session Classification:** P2 Posters