

## **Measurements of fast particles in the scrape-off layer region of EAST tokamak during ELM disruption using a retarding field analyzer**

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Steady-state operation of ITER requires high pressure plasmas in high energy confinement mode (H-mode). In H-mode plasmas edge localized modes (ELMs) are usually observed. Due to the high particle and heat loads on the divertor targets during the eruptions of ELMs, the control of ELM is essential for the safety and lifetime of the first wall for the future high power tokamaks. One important aspect is the fast particle loss, driven by the magnetic reconnection during ELM eruption.

In the second operational campaign of the EAST tokamak in 2016, the temporal evolution and radial structure of the fast particle in the scrape-off layer (SOL) region are measured during the ELM. In addition, a multi-channel retarding field analyzer [1] (RFA) with adapted bias settings were used.

In our RFA probe experiments, the fast particles are detected in the SOL region during ELM eruption, which could be probably driven by the magnetic reconnection, as indicated by magnetic pre-cursors. It is demonstrated that ions are detected earlier in a fixed position in the SOL region compared to the fast electrons. This observation indicates a higher sensitivity of the fast ions on the magnetic reconnection. However, a difference between the upstream and the downstream signals at the outer midplane could not be observed. Further, the comparison between RFA signals, magnetic signals, divertor probes, a first understanding of the behavior of fast ion and electron losses in case of the magnetic reconnection during ELM was found.

[1] M. Henkel et al, 2018, Plasma Sci. Technol. 20, 054001