

球状トカマク TST-2 におけるロゴスキープローブを用いた電流揺動計測
The measurement of current density fluctuation using a Rogowski probe in the TST-2 spherical tokamak

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In the TST-2 spherical tokamak device ($R \sim 0.38$ m, $a \sim 0.25$ m, $B_t \sim 0.3$ T, $I_p \sim 0.11$ MA), a Rogowski probe consisting of multi-layer Rogowski coils with high precision windings (for current density, j , measurement), pick-up coils was fabricated [1]. In Ohmic plasma discharges, fluctuations of the Rogowski coil signal from 10 to several hundreds kHz are observed. From the comparison between the signals of the Rogowski coils and the pick-up coils, and from electrostatic noise tests for the Rogowski coils, we found that the levels of the fluctuations of the Rogowski coil signals are enough higher than that of the expected noise signals.

At the IRE (Internal reconnection event) [2], signals of the Rogowski coils show spikes and oscillations in both positive and negative directions, and it was found that the magnitude of the current density oscillations increase with the increase of the magnitude of the plasma current spike. In addition, we succeeded in measuring the time relation between the plasma current and the edge current density j before and after the plasma current spike and the result is shown in Fig. 1. Fig. 1 shows that the j fluctuation starts firstly and j increases before the plasma current spike. After the decrease of j , plasma current shows a peak.

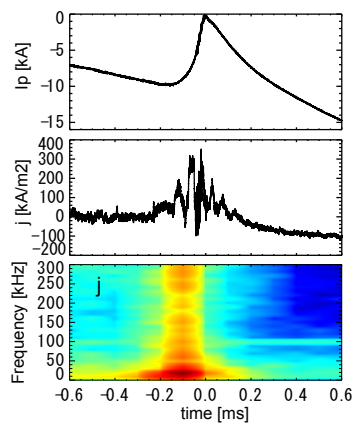


Fig. 1. Time relation between plasma current, j and j fluctuation before the plasma current spikes.

- [1] H. Furui, *et al.*, Rev. Sci. Instrum. **85**, 11D813 (2014).
 [2] A. Ejiri, *et al.*, Nucl. Fusion **43**, 547 (2003).