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大型ヘリカル装置の外寄せ配位で観測されるMHDモード
MHD instabilities observed in the outward-shifted configuration in LHD

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MHD instability in the large helical device (LHD) depends strongly on the location of the magnetic axis. When the magnetic axis is moved to outward (e.g., Rax = 3.9m), a magnetic well is formed the center of the plasma, the plasma is stable against the interchange modes.

The core density collapse (CDC) phenomena have been found in the outward shifted configurations of LHD. It is thought that CDC is triggered by the 3D ballooning mode localized in the edge region [1]. CDCs appear with a profile where the ideal ballooning mode localized in the edge region ($\rho \sim 0.8$) is unstable. However, it is unlikely the edge localized mode make the whole plasma collapsed; interaction between the edge modes and the core modes should be investigated. One observation supports this idea is that when the collisionality of the plasma is reduced, CDC is replaced with m = 1 oscillations. So far, the origin of this m=1 oscillations has not been identified. Recently in the core region of the outward shifted plasmas, similar m = 1 repeated oscillation or the event where the magnetic axis is swung repeatedly is found.

Fig. 1 shows the typical wave form of the core activities, namely axis-swing type oscillations. At the collapse timing, sawtooth-like waveforms are observed inboard side and outboard of the magnetic axis; since their phase are opposite, rapid shift of the magnetic axis from outboard to inboard explain this waveform. This movement repeats like the normal sawtooth phenomena. There are magnetic fluctuations in the frequency range of 40-70 kHz synchronizing with these events. In the poster, several types of core-localized mode including these phenomena will be presented.

[1] S. Ohdachi, et.al. Contrib. Plasma Phys. **50** 552 (2010)

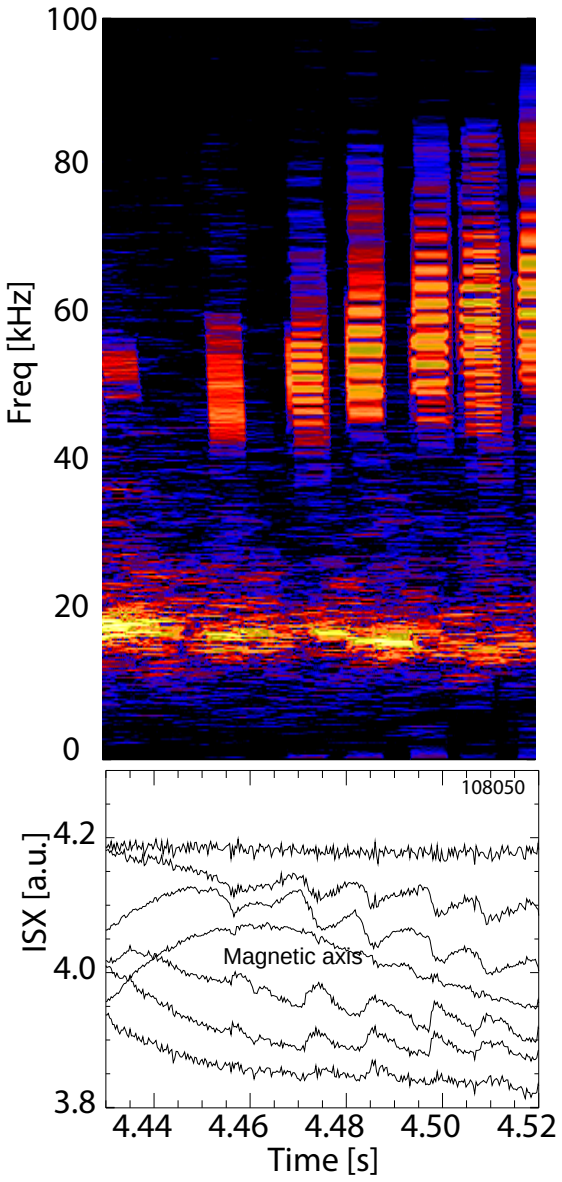

Fig. 1 Swing-type activities measured by the magnetic probe and SX detector array system.