

EXPERIMENTAL INVESTIGATION OF PLASMOID RECONNECTION AND ION HEATING DURING TRANSIENT CHI START-UP ON HIST



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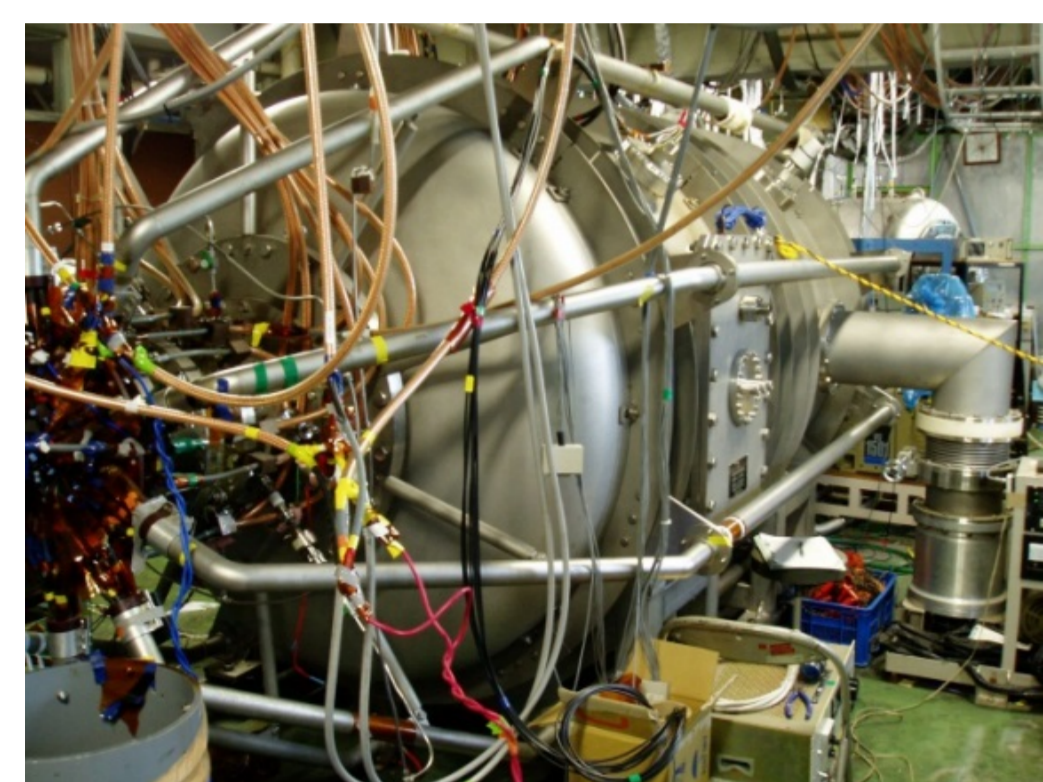
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2020, 28th IAEA-FEC



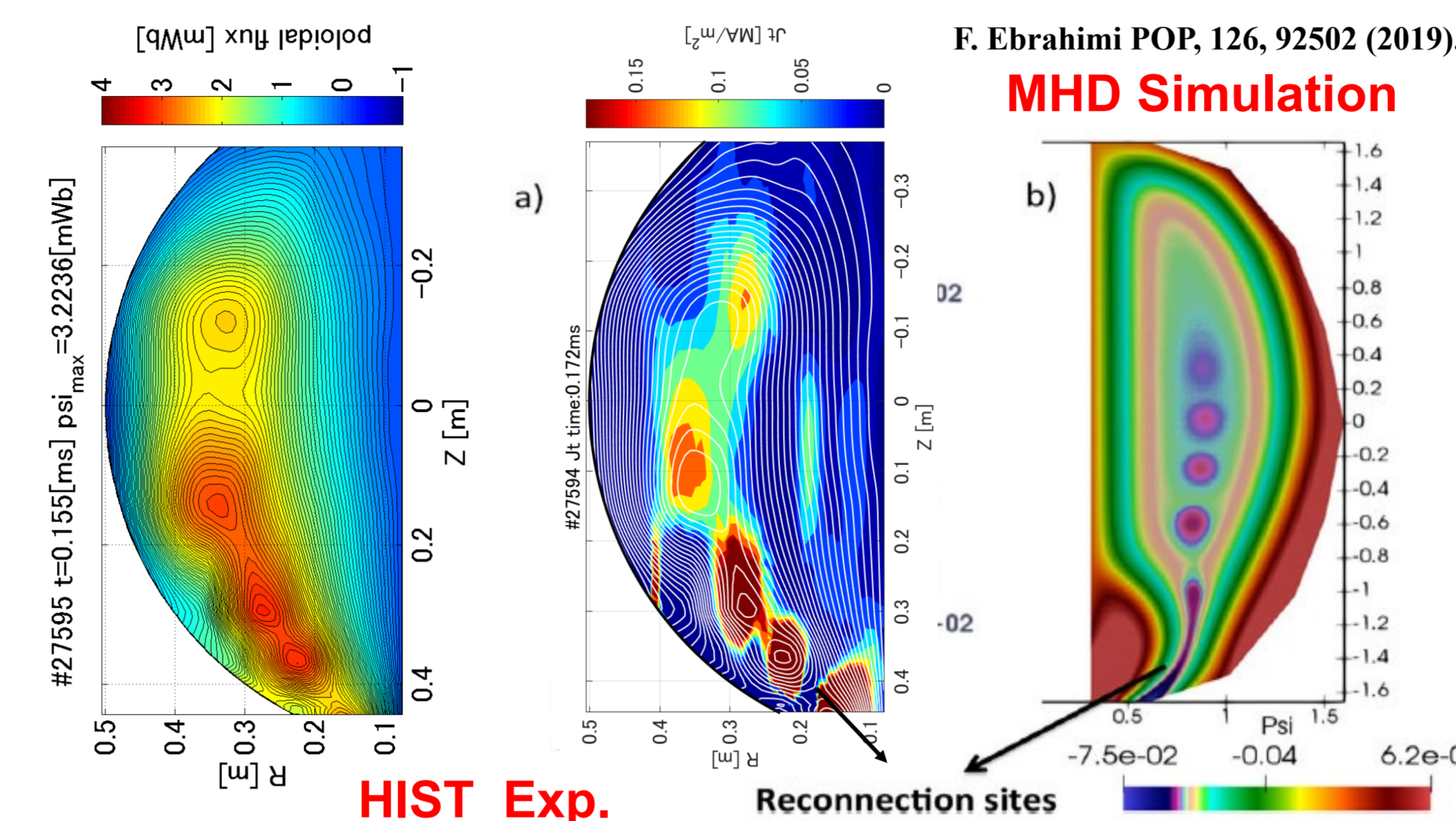
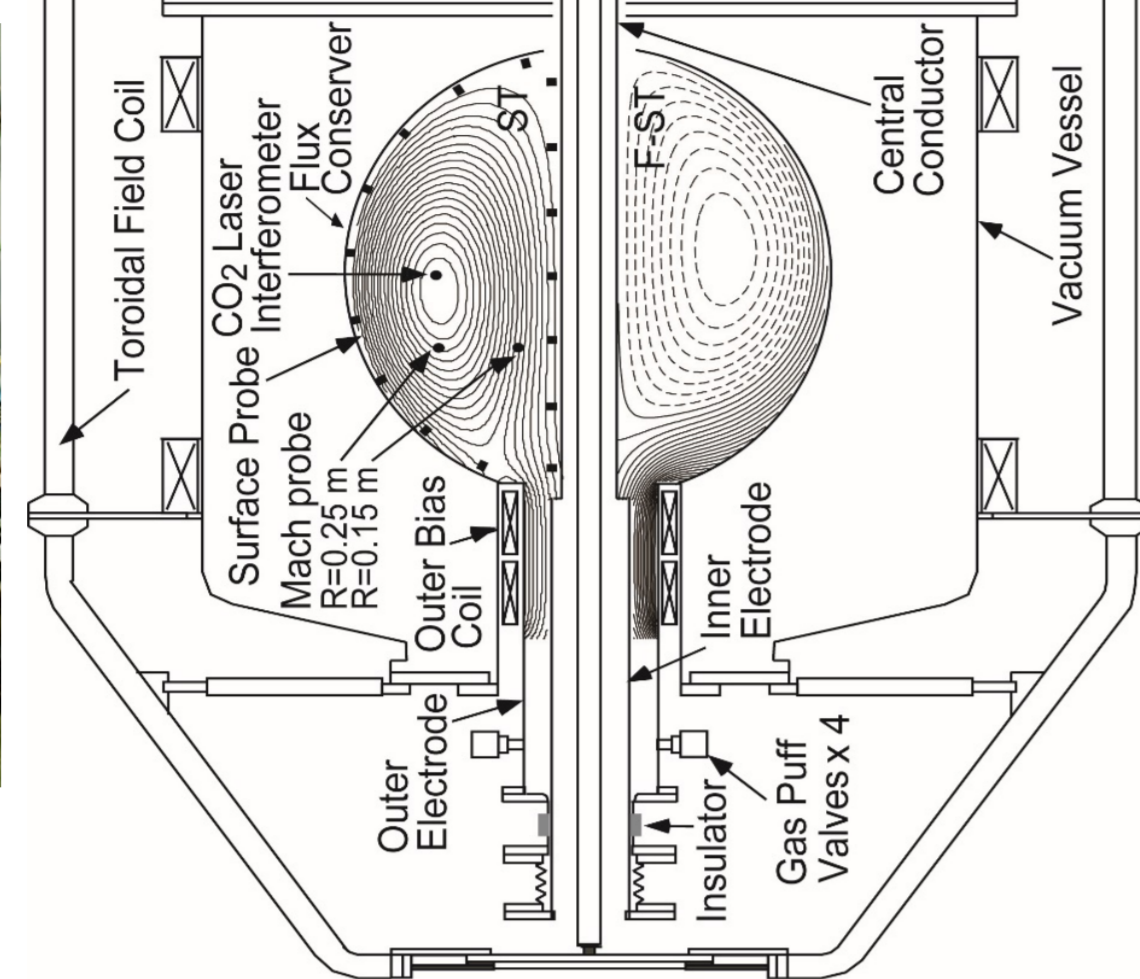
Background

- The key role of plasmoid-mediated fast magnetic reconnection has been experimentally investigated during transient-coaxial helicity injection (T-CHI) for non-inductive plasma start-up on HIST.

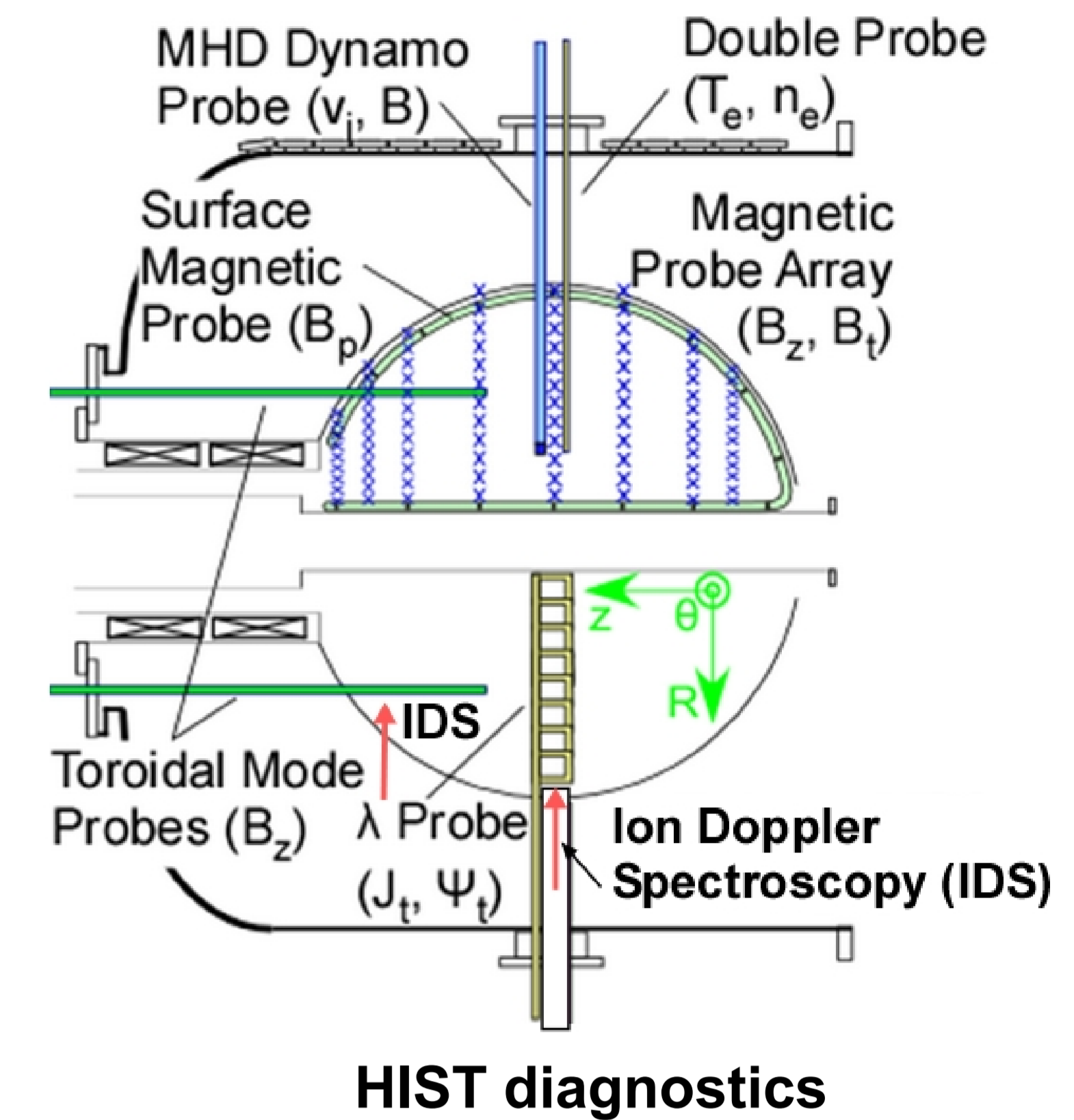


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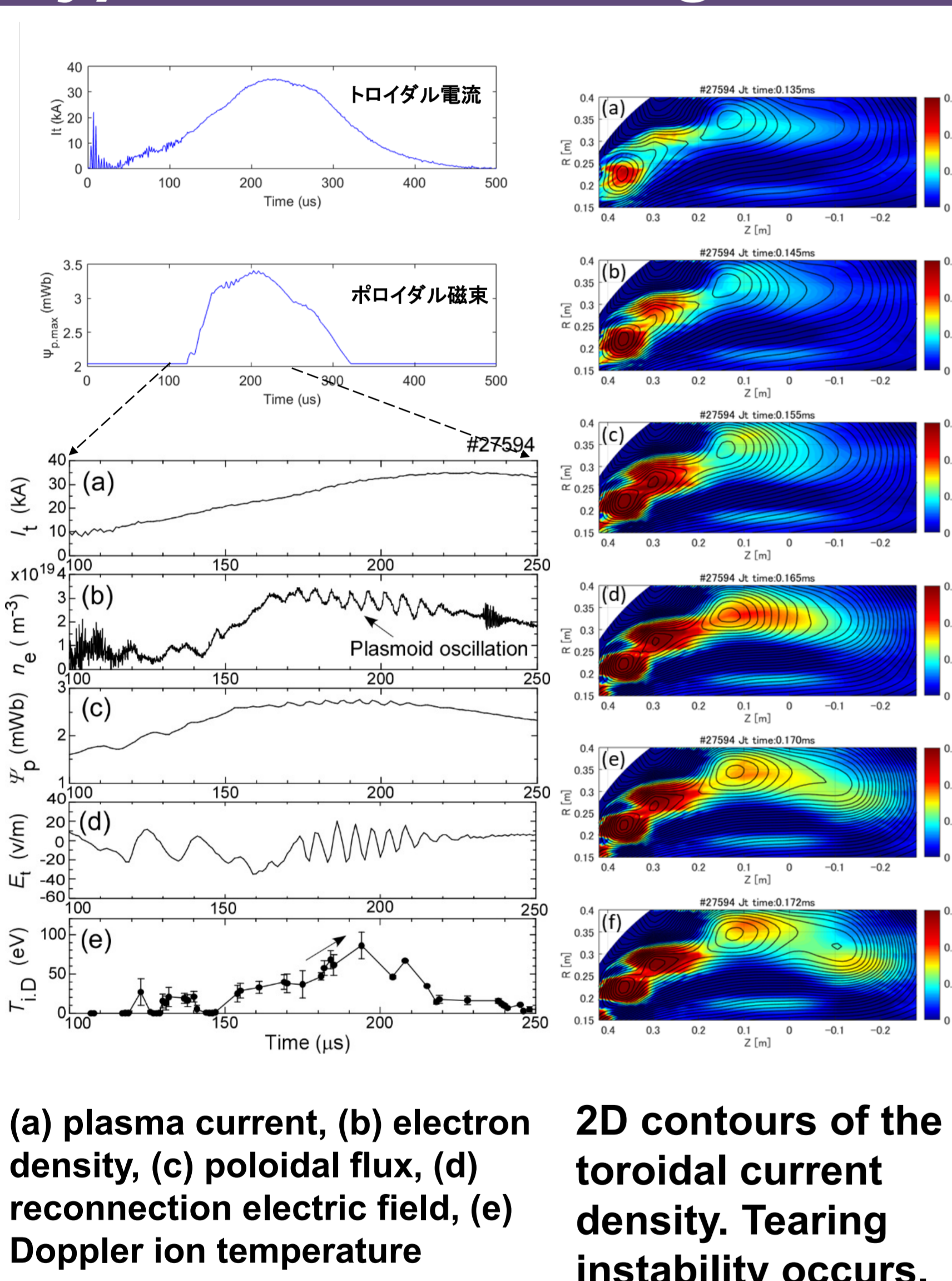


Diagnostics

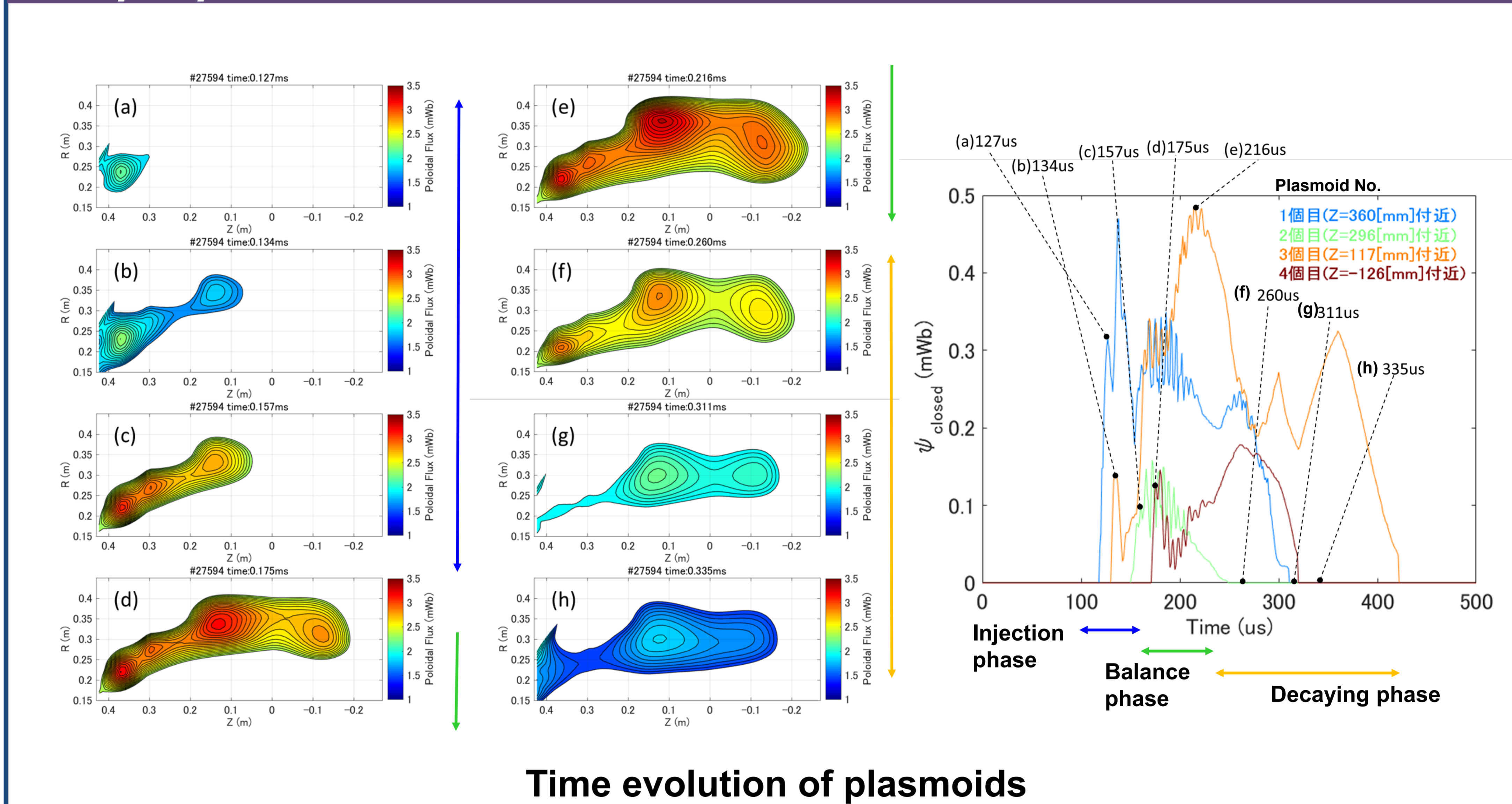


HIST diagnostics

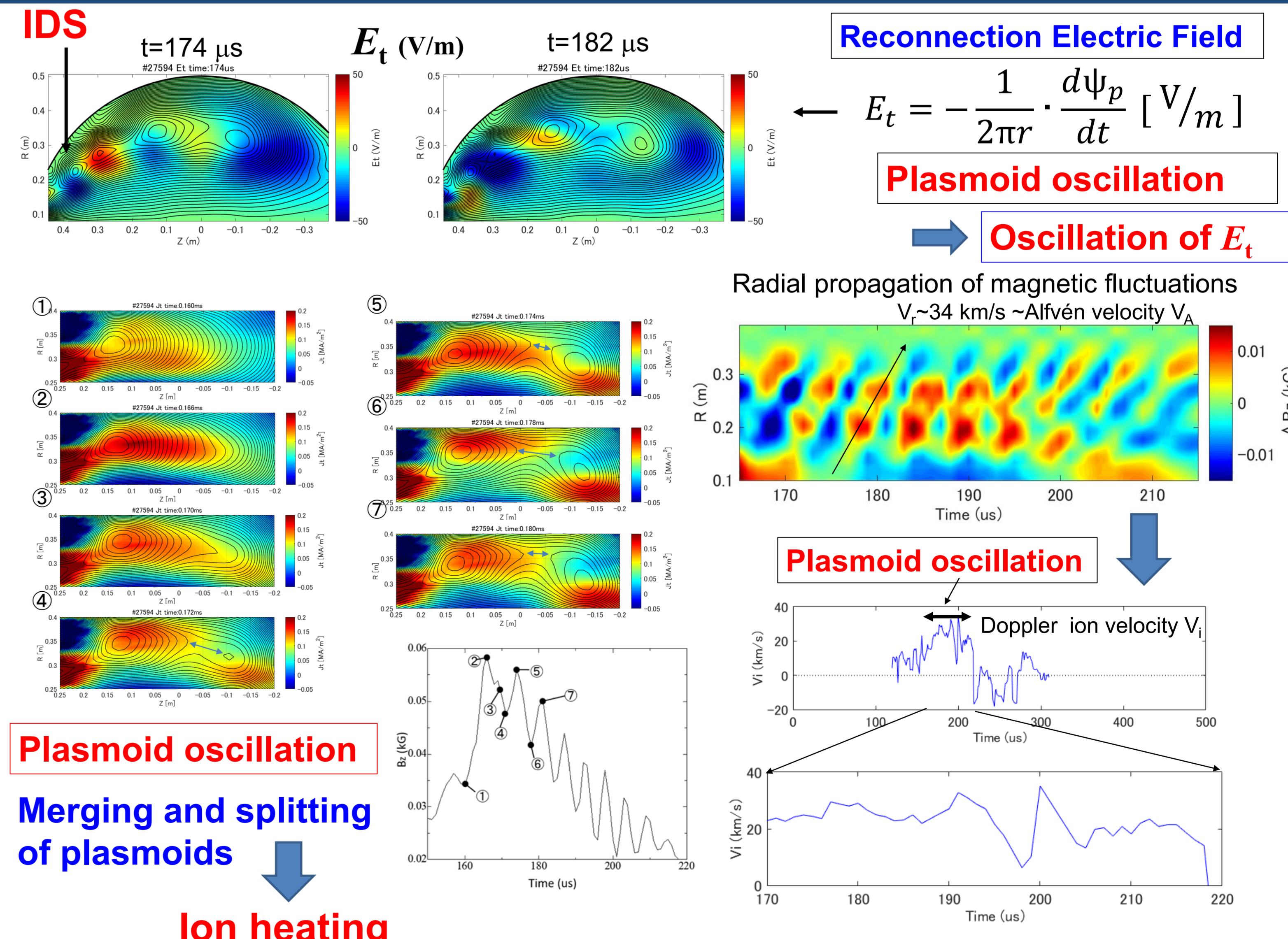
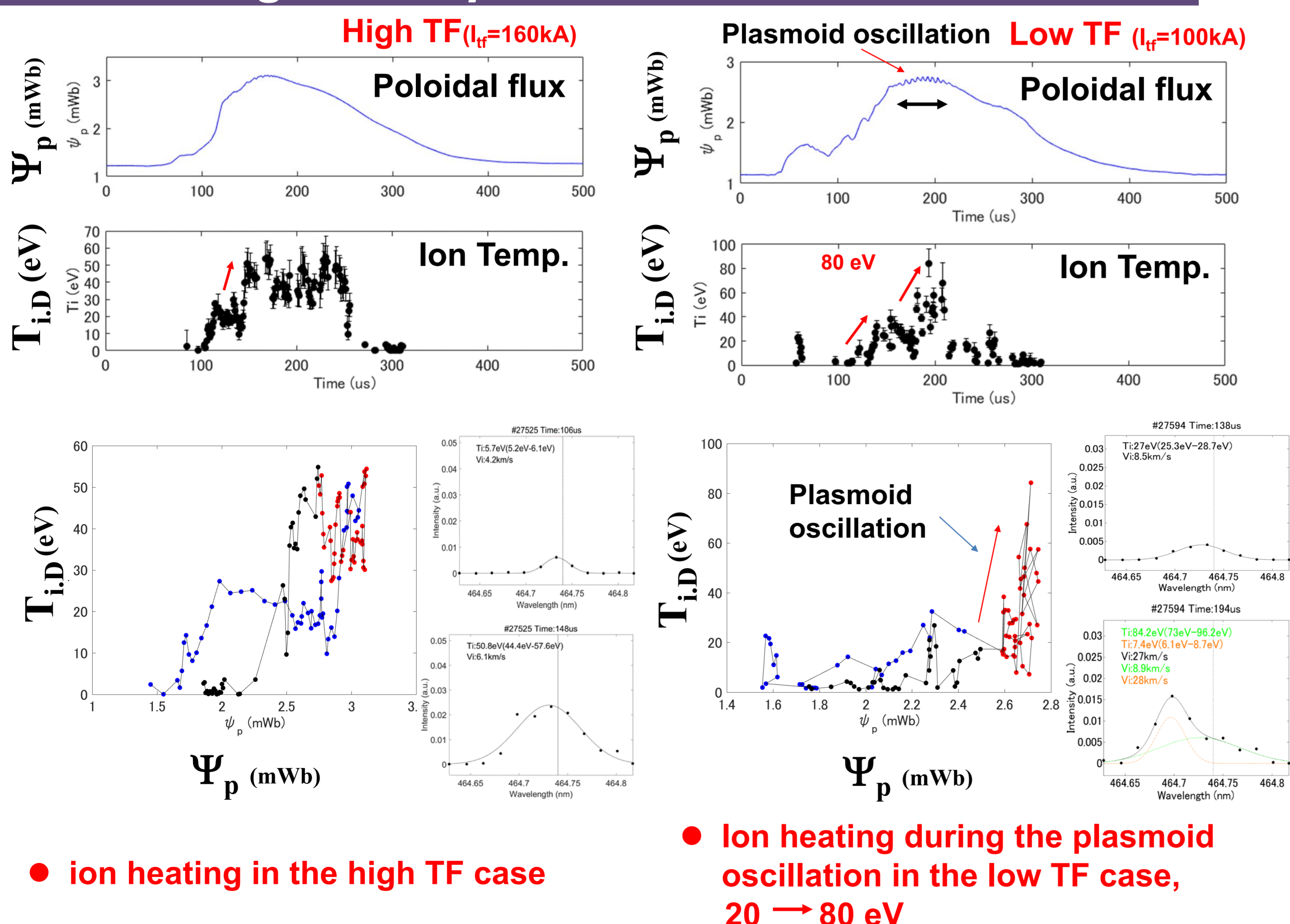
Typical CHI discharges



Multiple-plasmoids formation and behaviour



Ion heating due to plasmoid reconnection



Summary

- The experimental investigation has revealed the process of plasmoid-driven magnetic reconnection during transient-CHI on HIST. The experimental findings are as follows; (1) the separation and coalescence process of plasmoids is repeated after the elongated current-sheet becomes unstable during the CHI current start-up. (2) the ion heating is enhanced due to the repetitive reconnection during the plasmoid oscillation.