

Overview of Coordinated ST Research in Japan

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- ECW/EBW (LATE, QUEST)
 - Efficient CD at low N_{\parallel}
 - Bulk e heating at high N_{\parallel}
- LHW (TST-2)
 - RF induced transport model and X-ray emission model reproduce measured spectra
 - Extended MHD equilibrium with kinetic electrons show important modification due to fast electrons
- e-beam injection (LATE)
 - e-beam injected to EBW-driven ST plasma resulted in density increase up to $30 \times n_{\text{cut-off}}$
 - Significant core heating was observed but not I_p increase.
- T-CHI (HIST)
 - Multiple plasmoids are formed by tearing instability in the elongated current sheet
 - Flux closure and ion heating by plasmoid-mediated fast magnetic reconnection were observed.
- Optimization of I_p start-up (TST-2)
 - Low pressure limit for I_p start-up is extended to lower pressure region in TPC.
 - I_p ramp-up rate is higher for TPC.
- Reconnection heating by plasma merging (TS-*, MAST, ST40)
 - Reconnection heating energy increases proportional to B_{rec}^2 (B_{rec} : reconnecting B field).
 - $T_i = 2.3$ keV was achieved on ST40.
 - Promising for direct access to burning plasmas.
- VDE stabilization by local helical field (TOKASTAR-2)
 - VDE was stabilized by only a set of upper and lower triangular (ULT) coils.
- Steady-state operation by wall temperature control (QUEST)
 - Limitation of plasma duration is estimated by wall saturation time given by modelling.
 - 6h discharge was achieved by cool down of center stack cover.