

JOURNAL OF PLASMA AND FUSION RESEARCH

The Journal of the Japan Society of Plasma Science and Nuclear Fusion Research

Vol. 88, No.3, March 2012

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Top view of Low Aspect ratio Torus Experiment (LATE) device. Non-inductive plasma current start-up and ramp-up experiments by 2.45 GHz and 5 GHz magnetron system have been developed. Radial magnetic perturbation (MP) coils are installed in order to investigate the effect of MPs on fast electrons. The effect of weak MPs on energetic trapped electrons has an important role in improving EC-driven plasma discharges. (Fumitake WATANABE *et al.*, Plasma and Fusion Research Vol. 7, 1202005 (2012) <http://www.jspf.or.jp/PFR/>)