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Plasma Properties of Tearing Stabilized Regime by Rotating External 3d Field in the Presence of Error Field[1] MICHIO OKABAYASHI, N. LOGAN, PPPL, S. INOUE, QST, E.J. STRAIT, R.J. LA HAYE, N.Z. TAYLOR, GA, L. SUGIYAMA, MIT, PPPL COLLABORATION, QST COLLABORATION, GA COLLABORATION, ORAU COLLABORATION, MIT COLLABORATION — The edge density profile in a tearing stabilized regime produced by a slowly-rotating 3D field in the presence of a static error field (EF) has the unique property of building up an H-mode edge with a large density gradient. Reduced MHD simulations [S. Inoue (PPCF 2018, IAEA 2018)] have suggested that an external 3D field rotating above a critical velocity can shield out EF as well as the rotating 3D field itself and produce various stabilized tearing structure responses. The tearing structure can be isolated because the EF and rotating external 3D field do not fully penetrate inward radially. In DIII-D experiments, a single-helicity response was found to be produced as predicted, together with a sharp edge electron temperature gradient. Later, a multi-helicity response was formed with a sharp edge density gradient, but the electron temperature profile seems to be dominated by ergodic-magnetic transport, which may not be attractive for reactor application.

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