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Theory Experiment

Improved Error Field Correction in High Performance Plasmas,* Y. In, *FAR-TECH, Inc.*; M. Okabayashi, *PPPL*; G.L. Jackson, R.J. La Haye, P.E. Sieck, E.J. Strait, *GA*; J.M. Hanson, *Columbia U*; H. Reimerdes, *CRPP-EPFL* — Accurate error field correction (EFC) is highly desirable for high performance plasmas (e.g. steady-state, high- β plasmas). Feedback-controlled “dynamic error field correction” (DEFC) helps us not only monitor the plasma response to non-axisymmetric error fields but also determine a better EFC waveform. In recent high- β experiment, we confirmed that the use of “revised” EFC – in which the EFC waveform is pre-programmed to repeat the feedback output of a previous discharge – helped sustain the high- β phase longer than otherwise possible. This experiment used DIII-D’s C-coils, similar to ITER’s external EFC coils. Additional iteration of the DEFC will allow us to asymptotically find the “ideal” EFC waveform, achieving higher- β well above the $n=1$ no-wall stability limit. The combination of both internal and external coils in DIII-D, which would mimic the eddy current pattern in an ideal conducting wall, is expected to deliver substantially improved EFC.

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