Resonant pedestal pressure reduction induced by a thermal transport enhancement due to stochastic magnetic boundary layers in high temperature plasmas

O. Schmitz,[1] T.E. Evans,[2] M.E. Fenstermacher,[3] E.A. Unterberg,[4] M.E. Austin,[2] B.D. Bray,[2] N.H. Brooks,[2] H. Frerichs,[1] M. Groth,[3] M.W. Jakubowski,[5] C.J. Lasnier,[3] M. Lehnen,[1] A.W. Leonard,[2] S. Mordijck,[6] R.A. Moyer,[6] T.H. Osborne,[2] D. Reiter,[1] U. Samm,[1] M.J. Schaffer,[2] B. Unterberg,[1] W.P. West,[2] and the DIII-D and TEXTOR research teams

[1] *Forschungszentrum Jülich GmbH, IEF4-Plasma Physics, 52428 Jülich, Germany*
[2] *General Atomics, San Diego, California 92186-5608, USA*
[3] *Lawrence Livermore National Laboratory, Livermore, California, USA*
[4] *Oak Ridge Institute for Science and Education, Oak Ridge, Tennessee, USA*
[5] *Max Planck Institut für Plasmaphysik, Greifswald, Germany*
[6] *University of California, San Diego, La Jolla, CA 92093, USA*

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Good alignment of the magnetic field line pitch angle with the mode structure of an external resonant magnetic perturbation (RMP) field is shown to induce modulation of the pedestal electron pressure p_e in high confinement, high rotation plasmas in ITER similar shape at the DIII-D tokamak. This is caused by an edge safety factor q_{95} resonant enhancement of the thermal transport while in contrast, the RMP induced particle pump out does not show a significant resonance. The measured p_e reduction correlates to an increase in the modeled stochastic layer width during pitch angle variations matching results from resistive, low rotation plasmas at the TEXTOR tokamak. These findings suggest a field line pitch angle resonant formation of a stochastic magnetic edge layer as explanation for the q_{95} resonant character of type-I edge localized mode suppression by RMPs.

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