Effect of plasma shape on sawtooth oscillations

E.A. Lazarus,[1] F.L. Waelbroeck,[2] T.C. Luce,[3] M.E. Austin,[2] K.H. Burrell,[3] J.R. Ferron,[3] A.W. Hyatt,[3]

T.H. Osborne,[3] M.S. Chu,[3] D.P. Brennan,[4] P. Gohil,[3] R.J. Groebner,[3] C.L. Hsieh,[3] R.J. Jayakumar,[5]

L.L. Lao,[3] J. Lohr,[3] M.A. Makowski,[5] C.C. Petty,[3] P.A. Politzer,[3] R. Prater,[3] T.L. Rhodes,[6] J.T.

Scoville,[3] E.J. Strait,[3] A.D. Turnbull,[3] M.R. Wade,[3] G. Wang,[6] H. Reimerdes,[7] and C. Zhang[8]

[1]*Oak Ridge National Laboratory, Oak Ridge, Tennessee, USA*
[2]*University of Texas, Austin, Texas 78712.*
[3]*General Atomics, P.O. Box 85608, San Diego, California 92186-5608, USA*
[4]*Massachussets Institute of Technology, Cambridge, Massachusetts*
[5]*Lawrence Livermore National Laboratory, Livermore, California, USA*
[6]*University of California-Los Angeles, Los Angeles, California, USA*
[7]*Columbia University, New York, New York, USA*
[8]*ASIPP,China*

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The effect of plasma shape on sawtooth oscillations in the DIII-D tokamak plasmas is investigated by comparing discharges with cross-sections shaped like a bean and an oval. The two shapes are designed so that the Mercier instability threshold is reached when the axial safety factor is below unity for the bean and above unity for the oval cross-sections. This allows the role of interchange modes to be differentiated from that of the kink-tearing mode. The differences in the nature of the sawtooth oscillations in the bean and oval discharges are found to be determined primarily by extreme differences in the electron heat transport during the reheat. In both cases, the axial safety factor is found to be near unity following the crash.

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