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Identification of an Island-induced Alfvén Eigenmode in MST plasmas J.K. ANDERSON, C.R. COOK, C.C. HEGNA, J. BOGUSKI, R. FENG, K.M. MCCOLLAM, S.H. SEARS, University of Wisconsin, D.A. SPONG, S.P. HIRSHMAN, Oak Ridge National Laboratory — Recent theoretical work analytically computes the effect of a magnetic island on the shear Alfvén continuum and may explain unresolved Alfvénic activity observed in neutral beam-heated MST plasmas. Consideration of the previously-ignored core-localized n=5 island leads to theoretical Alfvén continua that provide a gap in which the observed n=4 Alfvénic bursts reside. Numerical simulations using the STELLGAP/AE3D codes, as well as a new code called SIESTAlfvén have identified the bursts as the first observation of an Island-induced Alfvén Eigenmode (IAE). The IAE arises from a helical coupling of mode numbers, similar to the helicity-induced Alfvén eigenmode, but occurs in the core of an island. The observed frequency of bursting n=4 Alfvénic modes fall within the island-induced gap over a wide range of MST operating parameters. Characteristics such as mode frequency, width and damping rate are measured as a function of experimentally-varied magnetic island width. Coincident bursts with toroidal mode number n=1 may exhibit frequency scaling of an Alfvénic eigenmode; the possibility of an island induced extremum mode is explored as an explanation. Work supported by US DoE under grants DE-FG02-99ER54546, DE-SC0006103 and DE-FC02-05ER54814.

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