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Impact of the Pedestal on Global Performance and Confinement Scalings in I-mode[1] JOHN WALK, JERRY HUGHES, AMANDA HUBBARD, DENNIS WHYTE, ANNE WHITE, MIT PSFC, ALCATOR C-MOD TEAM — The I-mode is a novel high-confinement regime pioneered on Alcator C-Mod, notable for its strong temperature pedestal without the accompanying density pedestal found in conventional H-modes. This separation in transport channels gives the desired improved energy confinement while maintaining low particle confinement, avoiding excessive impurity accumulation. Moreover, I-mode operation is naturally free of deleterious Edge-Localized Modes (ELMs). Recent experiments on Alcator C-Mod have characterized the pedestal structure in I-mode. The impact of the pedestal response (particularly to fueling and heating power) and core profile stiffness on global performance and confinement have demonstrated confinement metrics competitive with H-mode operation on Alcator C-Mod, and consistent with concepts for I-mode access & operation on ITER. Following the practice of the ITER89 and ITER98 scaling laws for L- and H-mode energy confinement, an initial, illustrative attempt at an I-mode confinement scaling has also been developed. The initial characterization from C-Mod data is consistent with the observed pedestal properties in I-mode, particularly the weak degradation of energy confinement with heating power, and comparatively strong positive response to fueling and increased magnetic field.

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John Walk
MIT PSFC

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