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Towards a Predictive Pedestal Height Model[1] P.B. SNYDER, A.W. LEONARD, T.H. OSBORNE, General Atomics, H.R. WILSON, U. of York — The pressure at the top of the edge transport barrier (or "pedestal height") strongly impacts tokamak fusion performance, and first principles prediction of the pedestal height remains an important challenge. While uncertainties remain, MHD stability calculations, accounting for diamagnetic stabilization, have been largely successful in predicting the observed pedestal height, when the barrier width is taken as an input. Studies of the pedestal dependence on power input support this understanding, while providing insight into the mechanisms responsible for setting the edge barrier width. Here, we present and characterize edge MHD stability results, including an updated model of diamagnetic stabilization, and a discussion of the mechanisms which can lead to an apparent power dependence of the pedestal. In addition, we explore initial, simple models for the barrier width. The barrier width models, as well as a combination of the width model with MHD stability calculation to directly predict pedestal height, are compared with an extensive set of observations on the DIII-D tokamak.

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