Abstract Submitted
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Effects of Particle Deposition Profile on LH Transition and Hysteresis Dynamics[1] MIKHAIL MALKOV, UCSD, PATRICK DIAMOND, UCSD, WCI Center for Fusion Theory, NFRI; Korea, WEIWEN XIAO, WCI Center for Fusion Theory, NFRI, Daejeon, Korea — The necessary ingredients in minimal model of the LH transition are: i) heat and particle transport ii) electric field shear suppression iii) heating and fueling sources. Of these, the most sensitive element seems to be the spatial structure of the fueling profile. It is known that deeper fueling (shallow pellet injection) can lower the transition threshold, and that SMBI (Supersonic Molecular Beam Injection) can maintain an H-mode reduced firing repetition rate, once the transition is achieved. This suggests hysteresis occurs in fueling, as well as heating. Given these observations, we generalize earlier work on transition modeling to treat two component fueling. In particular, we model fueling as occurring both by edge neutral penetration, and internal deposition (SMBI) at a finite depth within the separatrix. We also consider a periodic repetitive internal deposition by SMBI firing. Then we explore the sensitivity of the transition criterion. A further extension of previous analyzes is to replace the constant transport coefficients by gradient dependent. As an initial step, we determine the LH phase co-existence criterion for a two component fueling model. In particular, we explore the dependence of co-existence on the depth, relative strength and frequency of SMBI fueling.

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