

Abstract Submitted
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Sawtooth-free H-mode Discharges on DIII-D with Density and Impurity Control¹ K.H. BURRELL, C.M. GREENFIELD, C. ROST, M.R. WADE, W.P. WEST, DIII-D National Tokamak Program — By utilizing cryopumping to control the edge plasma density, ELM-free and sawtooth-free H-mode plasmas have been produced using neutral beam counter-injection in single-null divertor plasmas in DIII-D. Unlike most ELM-free discharges, these shots exhibit density, impurity, and radiated power levels which are constant in time throughout the ELM-free phase. This ELM-free and sawtooth-free state has lasted for up to 2500 ms, limited only by the neutral beam durations chosen. A critical input power above about 7.5 MW and critical line averaged density below about $3 \times 10^{19} \text{ m}^{-3}$ are required to reach this state. The presence of substantial edge pedestals in electron density and temperature and in ion temperature and rotation clearly indicates that these discharges are in H-mode. The confinement in these shots is at the standard H-mode level; relative to the ITER89P scaling, normalized confinement (H-factor) values are 1.8 to 2.4 depending on the neutral beam power used. The H-factor increases with increasing neutral beam power. At the highest power attempted, 12 MW, the normalized beta was 2.4.

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Prefer Oral Session
 Prefer Poster Session

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Special instructions: DIII-D Contributed Oral Session, immediately following M Murakami

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