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Category Number and Subject: 5.6.2 DIII-D tokamak

[ ] Theory [X] Experiment

Observation of Ion Transport Barriers Based on Te Perturbations in QH-Mode Discharges in DIII-D,* J.C. DeBoo, T.C. Luce, C.C. Petty and K.H. Burrell, *GA* – The quiescent H-mode (QH-mode) in DIII-D is an ELM-free, high-confinement mode of operation that contains an internal transport barrier, ITB, in a stationary state that yields high performance plasmas. The stationary nature of the ITB and lack of ELM perturbations allows the barrier characteristics to be studied with the application of heat pulses initiated outside the barrier by monitoring the amplitude and phase of the heat pulses as they propagate toward and through the barrier. T_e perturbations of 3%-5%, localized at ρ=0.7, were produced with ECH from 110 GHz gyrotrons. The T_e heat pulses produced T_i perturbations of 2%-3% and thus both electron and ion transport behavior can be studied. An ion ITB was much more prominent than was an electron ITB. Localized reduction in the amplitude of the T_i perturbations was observed and can be used to infer an ion barrier that is a spatially localized region of significantly reduced thermal diffusivity centered at $\rho\sim0.5$ with a width of up to 15 cm. Perturbations in toroidal rotation velocity will also be discussed.

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[ ] Oral [X] Poster