Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Real-Time Variation of the Injected Neutral Beam Energy on the DIII-D Tokamak,*[1] J.T. SCOVILLE, B.J. CROWLEY, D.C. PACE, J.M. RAUCH, General Atomics — A powerful new technique for smoothly controlling the time evolution of injected energy from neutral beams has recently been implemented on the DIII-D tokamak. Upgrades to the high voltage circuitry of the neutral beams and to the tokamaks Plasma Control System have enabled the first-ever continuous variation of beam voltage during plasma shots. This avoids the perturbative effects of pulse modulation, which was the previously employed method for changing the injected beam power. The new technique allows much finer control of the injected energy, with beam voltage able to be varied smoothly over a 20 kV range (within the 45-85 kV beam operating space) in 0.5 sec. This capability enables fundamentally new experiments that require precise control of beam ion phase space, including the minimization of undesirable energetic ion instabilities and scans across low torque regimes at fixed power. We present a description of the beam system modifications and initial results from plasma experiments using the new variable beam energy capability on the DIII-D tokamak.

[1]Work supported by U.S. DOE under DE-FC02-04ER54698.

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Date submitted: 11 Jul 2016 Electronic form version 1.4