

Abstract Submitted  
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**Testing the DIII-D Co/Counter Off-Axis NBI Performance for Accessing High Beta Steady State Scenarios**<sup>1</sup> B.A. GRIERSON, F.M. POLI, PPPL, J.M. PARK, ORNL, B.S. VICTOR, C.T. HOLCOMB, LLNL, M.A. VAN ZEELAND, K.E. THOME, GA, W.W. HEIDBRINK, UCI, DIII-D TEAM — The DIII-D tokamak has recently undergone a major upgrade to orient a second neutral beamline for off-axis injection to broaden current and pressure profiles for high  $\beta_N$  steady-state scenarios. Predictive integrated modeling of high beta steady-state scenarios on DIII-D indicate that the additional off-axis power will achieve fully non-inductive operation at  $\beta_N = 4.4$  with  $q_{95} = 6.9$ . In this presentation, we will present the testing of the neutral beam performance, and show how time-dependent application of the heating and current drive systems are predicted to achieve the steady state target in DIII-D. The upgraded beam is permanently off-axis with a downward angle of 18.55 degrees and toroidally steerable for injection in either the co-current (20.5 degrees from radial) or counter-current (19.5 degrees from radial) direction. Initial experiments have been performed that test the performance of the neutral beam by using visible imaging of the neutral beam shape, short and long neutral beam pulses for beam-target neutron production and fast ion confinement. Results of these initial checkout experiments that establish the absolute injection geometry and power will be presented, along with TRANSP predictions for achieving low net torque operation.

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