Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Beam ion confinement on NSTX-U[1] D. LIU, W. W. HEIDBRINK, G. Z. HAO, Univ of California - Irvine, M. PODESTA, D. S. DARROW, E. D. FREDRICKSON, PPPL — A second and more tangential neutral beam line is a major upgrade component of the National Spherical Torus Experiment – Upgrade (NSTX-U) with the purpose of improving neutral beam current drive efficiency and providing more flexibility in current/pressure profile control. Good beam ion confinement is essential to achieve the anticipated improvements in performance. In the planned beam ion confinement experiment, various short and long (relative to fast ion slowing-down time) neutral beam (NB) pulses from six neutral beam sources will be injected into center-stack limited L-mode plasmas to characterize the beam ion confinement and distribution function produced by the new and the existing NBI lines. The neutron rate decay after the turn-off of short NB pulses will be used to estimate the beam ion confinement time and to investigate its dependence on NB source/geometry, injection energy, and plasma current. The tangential and vertical Fast-Ion D-Alpha (FIDA) diagnostics and multi-view Solid State Neutral Particle Analyzer (SSNPA) arrays will be used to measure beam ion slowing-down distribution function and spatial profile during the injection of relatively long NB pulses. Beam ion prompt losses will be monitored with a scintillator Fast Lost Ion Probe (sFLIP) diagnostic. The experimental data and comparisons with classical predictions from NUBEAM modeling will be presented.

[1]Work supported by U.S. DOE DE-AC0209CH11466, DE-FG02-06ER54867, and DE-FG03-02ER54681.

Deyong Liu
Univ of California - Irvine

Date submitted: 14 Jul 2016 Electronic form version 1.4