Abstract Submitted
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Comparison of fast ion confinement during on-axis and off-axis neutral beam experiments on NSTX-U D. LIU, W.W. HEIDBRINK, G.Z. HAO, UC Irvine, M. PODESTA, D.S. DARROW, E.D. FREDRICKSON, S.S. MEDLEY, 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 fast ion confinement is essential to achieve the anticipated improvements in performance. In a planed "sanity check" experiment, various short and long (relative to fast ion slowing-down time) neutral beam (NB) pulses with different source mixes will be injected into quiescent L-mode plasmas to characterize the fast 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 fast ion confinement time and to investigate its dependence on NB source/geometry, injection energy, and plasma current. The newly installed Solid State Neutral Particle Analyzer (SSNPA) and Fast-Ion D-Alapha (FIDA) diagnostics will be described and will be used to measure fast ion slowing-down distribution function and spatial profile during the injection of relatively long NB pulses. Fast ion prompt losses will be monitored with a scintillator Fast Lost Ion Probe (sFLIP) diagnostic. The experimental techniques, measurements of fast ion confinement time and distribution function, and comparisons with classical predictions from NUBEAM modeling will be presented in detail.
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