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**Investigation of Fast-Ion Redistribution or Loss due to MHD Modes and Alfvén Instabilities in NSTX** SID MEDLEY, DOUG DARROW, ERIC FREDRICKSON, JON MENARD, Princeton University — In the National Spherical Torus Experiment (NSTX), fast-ion redistribution or loss due to two types of instabilities has been observed: low- $n$  kink/tearing-like modes and fast-ion driven instabilities such as chirping Energetic Particle Modes (frequency range 0–120 kHz) and Toroidal Alfvén Eigenmodes (frequency range 50–200 kHz). Both the volume-integrated neutron and the line-integrated charge exchange neutral particle diagnostics show fast-ion depletion due to such instabilities, but cannot distinguish between redistribution or loss. Two recently implemented diagnostics on NSTX, the Motional Stark Effect (MSE) and scintillator Fast Lost Ion Probe (sFLIP), facilitate separation of redistribution and loss effects. Outward redistribution of the core-peaked energetic beam ions modifies the beam-driven current profile and hence the core  $q$ -profile. MSE-constrained  $q$ -profiles are used to assess this effect. sFLIP measures the pitch and energy of fast ions that are ejected from the plasma and intercept the wall-mounted probe thus identifying fast-ion loss. Observations and TRANSP simulations of a range of fast ion instability-induced redistribution/loss phenomena in NSTX will be presented.

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