

# **Analysis of fast-ion $D_\alpha$ data from the National Spherical Torus Experiment**

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## **Abstract**

Measured fast-ion  $D_\alpha$  (FIDA) data from an extensive NSTX database are compared to “classical” predictions that neglect transport by instabilities. Even in the absence of detectable MHD, in virtually all cases, the profile peaks at smaller major radius and the profile is broader than the predictions. Abrupt large-amplitude MHD events flatten the FIDA profile, as do most toroidal Alfvén eigenmode (TAE) avalanche events. Generally, the onset of a long-lived mode also flattens the FIDA profile. There is a shortfall of high-energy ions at large major radius in discharges with repetitive TAE bursts. If available, preliminary FIDA data from NSTX-U will also be presented.