

# Impurity transport studies in neutral beam heated spherical tokamak H-mode plasmas

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## Abstract

The first experimental assessment of low-Z impurity transport, in a neutral beam heated H-mode plasma sustained in a low-aspect ratio spherical tokamak, was performed at the National Spherical Torus Experiment (NSTX). The injected impurities penetrate to the core on a hundred millisecond time scale, indicating low core particle diffusivity ( $\lesssim 1 \text{ m}^2/\text{s}$ ) in good agreement with the values predicted by neoclassical transport theory. In addition, a fixed  $q$ -profile magnetic field scan showed reduced impurity penetration at high fields. This result suggests that anomalous ion particle transport associated with turbulent long-wavelength electrostatic instabilities must be largely suppressed in the NSTX core.