

Abstract Submitted  
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**Characterization of tearing modes in NSTX<sup>1</sup>** JEONG-HUN YANG, MARIO PODESTA, ERIC FREDRICKSON, KEVIN TRITZ, Princeton Plasma Physics Laboratory — Tearing mode (TM) instabilities are analyzed experimentally in NSTX plasmas. 2-D soft X-ray measurements are used to infer the magnetic island width, phase and radial location, by mapping the perturbed emissivity on the flux surfaces reconstructed from the equilibrium emissivity with Abel inversion. Fitting results are complemented by the data, on mode frequency and number from Mirnov coils and on mode frequency and location from plasma rotation. The TM parameters are then included in interpretive TRANSP simulations to test and validate two models for TM physics. The first model aims at predicting TM stability based on an analytic representation of the island (Poli et al., Nucl. Fusion 2018). The second model is then used to assess energetic particle transport caused by the magnetic islands (Bardoczi et al., Plasma Phys. Control. Fusion 2019). Validated TM models in TRANSP will enable predictive studies of the role of TM instabilities in integrated simulations.

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