

Abstract Submitted
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Survey of microinstability and simulated turbulent transport in NSTX WALTER GUTTENFELDER, PPPL, JEFF CANDY, General Atomics, STANLEY KAYE, RONALD BELL, BENOIT LEBLANC, YANG REN, PPPL, HOWARD YUH, Nova Photonics Inc. — Linear gyrokinetic simulations demonstrate a large variety of microinstabilities are possible in NSTX. Microtearing modes are often unstable in the core region ($r/a=0.5-0.8$) of NBI heated H-modes. In cases without Lithium wall conditioning, the local $E \times B$ shearing rates are larger than linear growth rates ($r/a=0.5-0.6$). Instead, the ETG instability (at electron scales) is unstable; nonlinear simulations in this region will be presented. Farther out ($r/a=0.7-0.8$), and in plasmas with Lithium wall conditioning, other ion scale instabilities can co-exist with, or dominate, microtearing modes. The nature of these ballooning modes is complicated and can exhibit ITG/TEM or KBM behavior depending on the MHD alpha parameter ($\alpha_{MHD} = -q^2 R \nabla \beta$). In limited cases tearing-parity ITG modes have also been identified. While non-linear simulations of these “mixed-mode” conditions are challenging, first attempts are underway. This work is supported by US DOE contract DE-AC02-09CH11466.

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