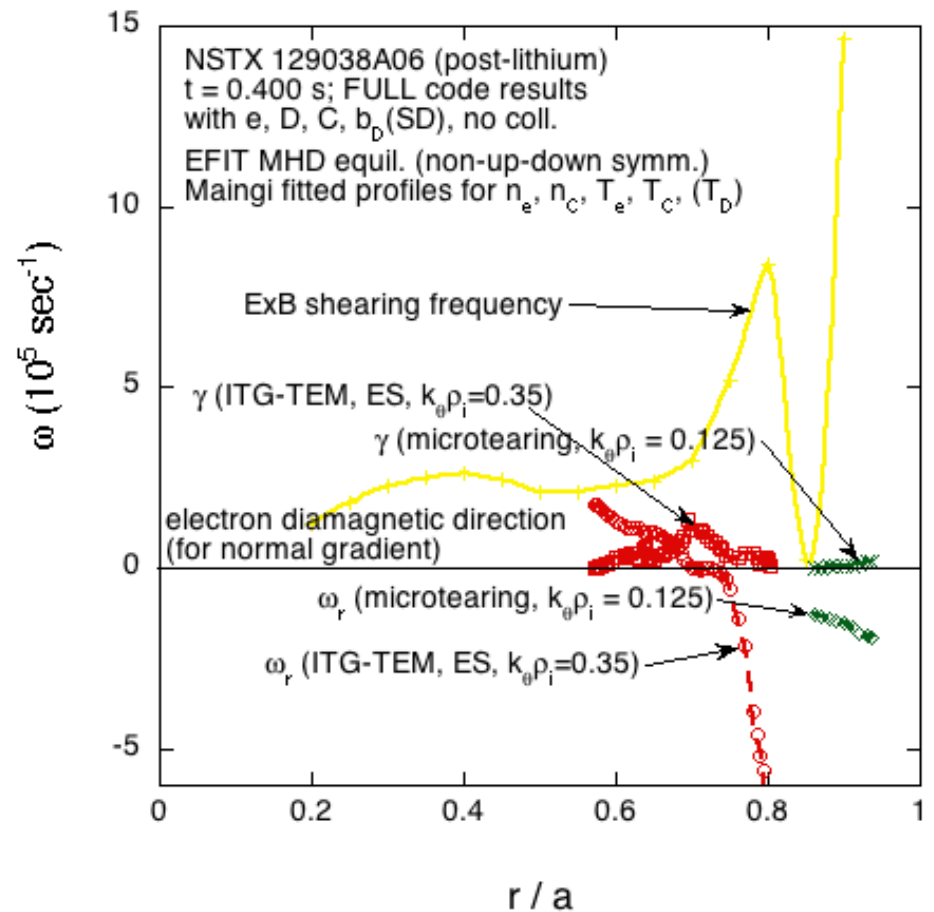
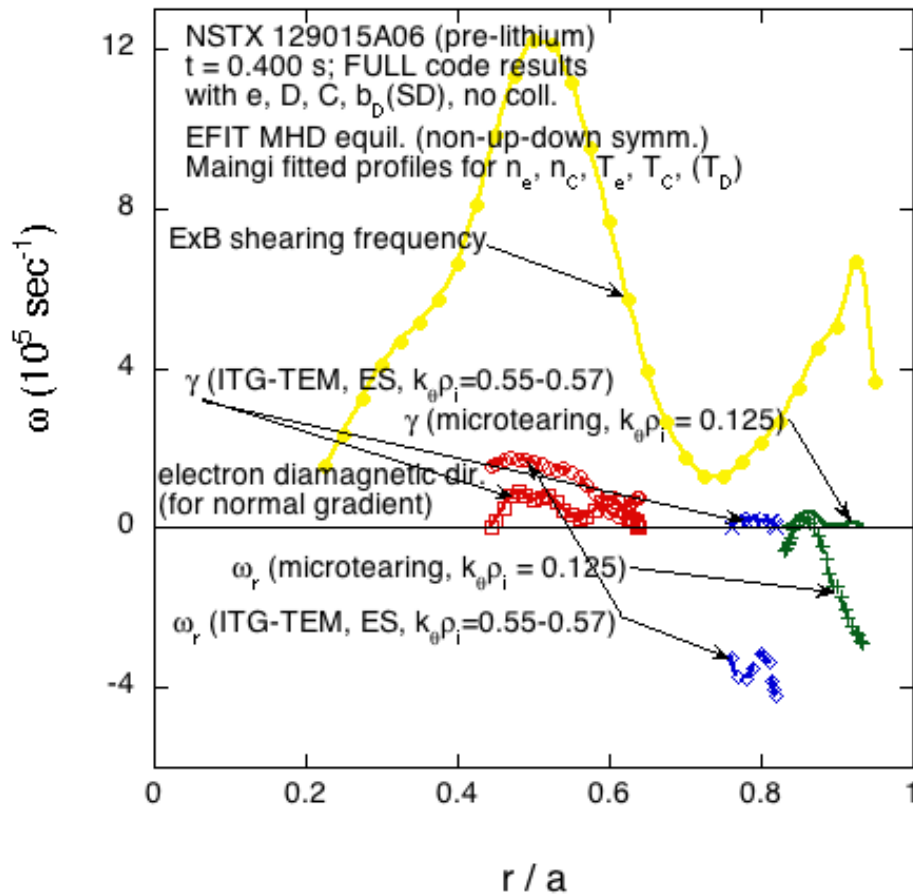


FULL Code Microinstability Calculations for NSTX Pre- and Post-Lithium Edge Regions

G. Rewoldt (with R. Maingi, J. Menard, S. Kaye, A. Diallo, G. Hammett, ...)

- First developed in 1980, the FULL gyrokinetic eigenvalue code is useful for surveys of linear growth rates, etc, for ITG, TEM, microtearing, KBM, ..., roots.
- The FULL code is linear and quasilinear, radially-local (ballooning representation), electrostatic or electromagnetic, with trapped electrons, multiple ion species, FLR effects, model electron collision operator, axisymmetric and non-axisymmetric (stellarator) versions.
- Here, FULL code is applied to NSTX pre- and post-lithium shots. We have successively improved the input data, going from JSOLVER MHD equilibria computed using TRANSP data, to kinetic EFIT MHD equilibria (slightly up-down non-symmetric). We have also gone from density and temperature profiles from initial TRANSP runs, to those from improved TRANSP runs, to most recently using n_e , n_C , T_e , T_C (and thus T_i) profiles bypassing TRANSP (and thus not constrained by the TRANSP grid) (with the remaining input profiles still from the improved TRANSP runs).
- The calculation includes electrons, thermal deuterium ions, carbon impurity ions, and hot deuterium beam ions (with a slowing-down distribution function). Results presented here are in the collisionless limit, and both the electrostatic and electromagnetic versions of FULL are used.

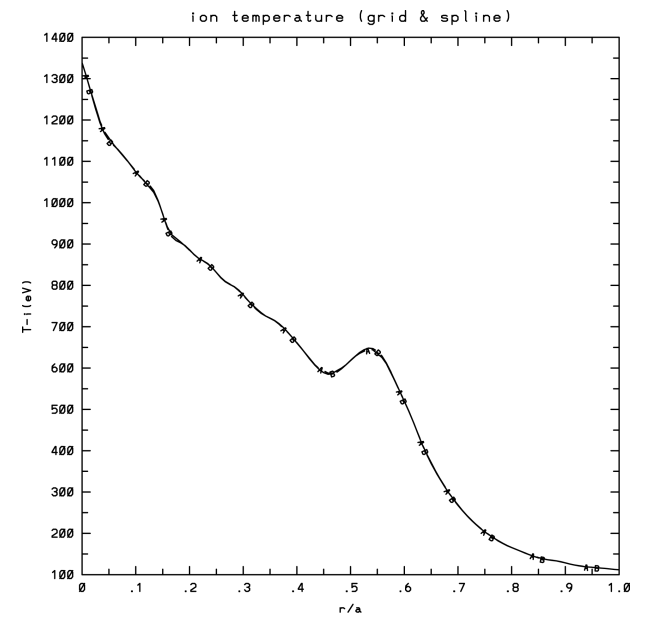
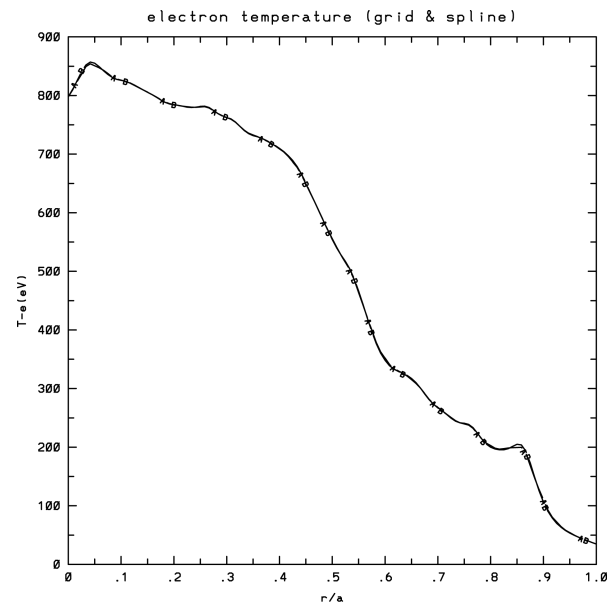
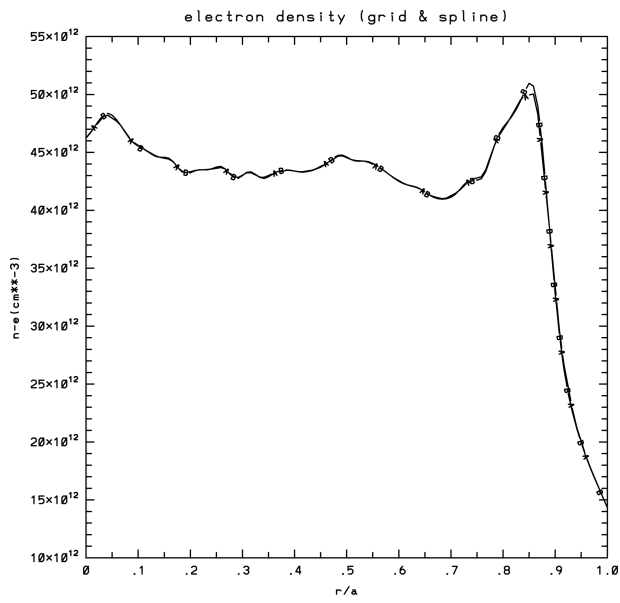
NSTX Shots 129015 (pre-lithium) and 129038 (post-lithium)



- FULL finds ITG-TEM and antisymmetric (“microtearing”) instabilities in pedestal region, but has not found KBM instabilities there so far.
- Relatively healthy linear growth rates, but ExB shearing frequencies (from TRANSP post-processor) are substantially greater!
- Looking for major difference between pre-lithium and post-lithium shot (linear) microinstabilities, but so far the two shots look fairly similar!

Backup Slides

Profiles for NSTX shot 129015A06 at $t = 0.400$ s



Profiles for NSTX shot 129038A06 at t = 0.400 s

