

# NSTX Team Meeting - Physics Analysis

June 17, 2004

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# Heating and CD Modeling

- **TRANSP Packages >> GENRAY / CQL3D :**
  - initial steps for installation taken
    - » CVS repository for code modules set up
    - » discussed plans for developing interface routines
  - collaboration with R. Harvey (CompX)
- **HHFW code development >> RF SciDAC:**
  - proposal came in “third” -- may get funded if fusion budget is increased enough to provide funds for FSP
    - » supports NSTX modeling needs
- **EBW code development >> AORSA-1D**
  - 1) boundary conditions for impedance match to OPTIPOL code have been implemented (ORNL collaboration).
  - (2) Currently studying absorber conditions to efficiently model boundaries in the AORSA1D basis set.
  - (3) Next step: preliminary evaluation of feasibility of 28 GHz system.

# Microstability Analysis with GS2

- Paper to be submitted at EPS 2004 meeting:

*"Nonlinear Turbulence Simulations for NSTX H-modes"*, M. H. Redi, S. Kaye, W. Dorland, R. Bell, C. Bourdelle, B. LeBlanc, D. Gates, G. Hammett, K. Hill, D. McCune, J. Menard, D. Mikkelsen, G. Rewoldt, E. Synakowski

- » focuses on the linear stability analysis for high density H-modes
- » details the unexpected complexity of the microtearing instability, leading to greatly increased computational memory requirements, compared to the ion temperature gradient microinstability calculations.

- first nonlinear calculations being made now on the NERSC IBM SP computer which has the necessary memory requirements

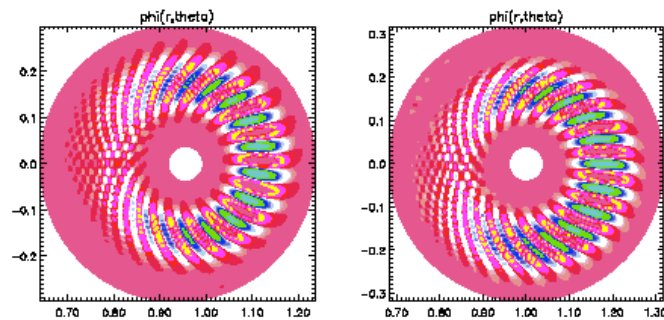
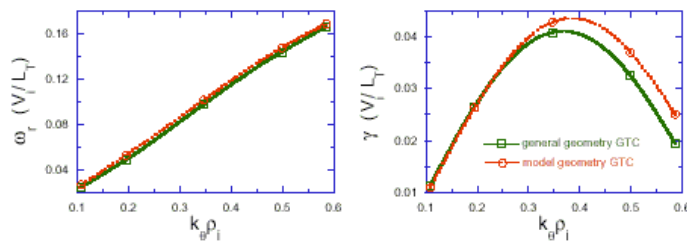
- » key contributions from Stephane Ethier/PPPL

- » discussions held with Bill Dorland (U. MD), who visited PPPL last week, and David Applegate (Imperial College).

# General geometry GTC has made significant progress – Benchmarking is underway

- **General geometry GTC** is being developed with enhanced and extended features including systematic treatment of plasma rotation and equilibrium EXB flow (calculated from GTC-Neo), realistic plasma profiles and MHD equilibrium and electron dynamics etc.

Benchmark with Original GTC  
(Large Aspect Ratio and Circular Geometry)



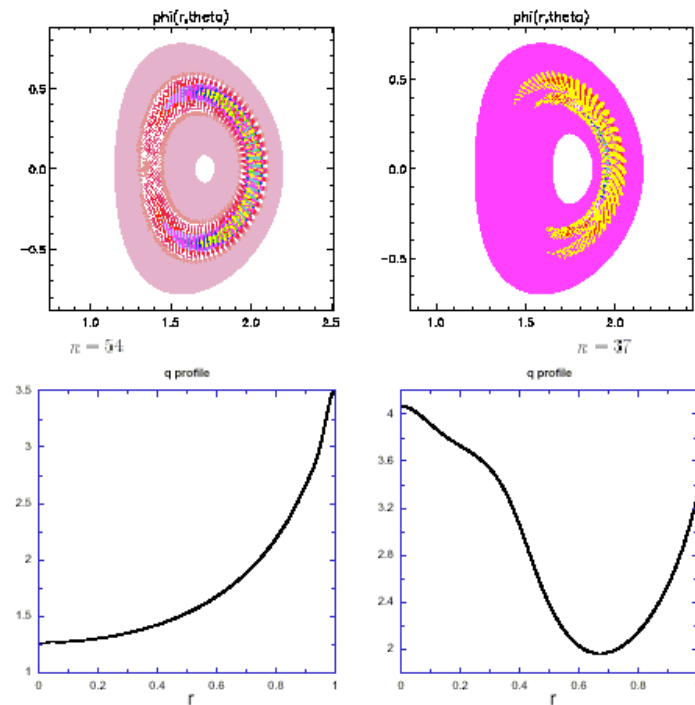
(General geometry GTC)

(Original GTC)

Comparison with original large R/a GTC

## Shaped Tokamak Geometry

DIID size,  $\eta_i = 3.12$ ,  $k_\theta \rho_i = 0.35$



A shaped geometry application  
Comparing monotonic and RS profiles

# MHD and Equilibrium Studies

- Wubiao Zhu has been studying toroidal rotation damping in NSTX
  - Student of S. Sabbagh
  - will present his latest results at the NSTX Physics meeting on 6/22