

Simple plasmas for Transport and Turbulence code benchmarking



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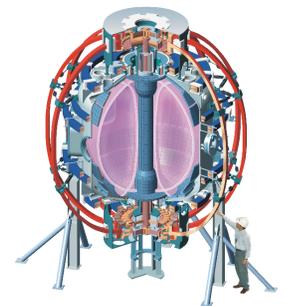
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NSTX FY'05 Research Forum

Boundary Physics ET Session

23 September 2004

Princeton, NJ



Simple plasma should be a starting point in the edge T & T modeling effort

- “Simple as possible plasmas” for modeling benchmarking first proposed by Stangeby, 2000
- Several years of positive experience at D-IIID and Alcator C-mod. Improved understanding of edge phenomena, codes and diagnostics
- Proposed by A. Pigarov (UCSD) for NSTX at Research Forum in 2003
- Can generate a feedback loop for modeling result assesment, as in case of BOUT
- Consider it “shape (or rtEFIT) development work” for modeling

Status of edge transport modeling in NSTX

- Two codes used: 2D multifluid code UEDGE (LLNL, UCSD), turbulence code BOUT (LLNL), neutral MC code DEGAS 2 (PPPL)
 - Both use EFIT equilibrium for grid generation
 - Status of modeling - ref. to presentations of A. Pigarov, M. Umansky at Results Review FY'04
- “NSTX is a very non-trivial case to model !”**
- Modeling effort started in 2001. Best modeled to date - shot 109033, L-mode LSN plasma
 - Obtained experience will guide experiment design



What is a simple NSTX plasma in the context of UEDGE/DEGAS 2/BOUT modeling?

- L-mode steady state LSN plasma, 1 NBI, $B_t=4.5$ kG, MHD-free, LFS-fueled
- Two sets of diagnostics: “slow” (ms) and “fast” (10’s us)
- Special consideration for shape / equilibrium, operational issues, choice of diagnostics
- Initially produce several well reproducible well diagnosed plasmas
- In the future scan parameters (drsep, n_e , PNBI, etc)
- Will not replace NSTX XP’s for edge transport and turbulence studies

Request 1/ 2 day initially