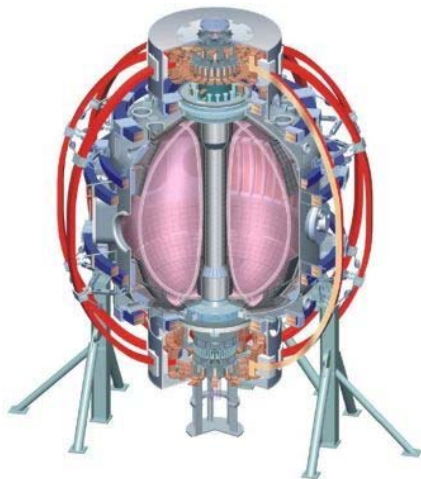


T&T TSG Theory Brainstorming Topics

Columbia U
 CompX
 General Atomics
 FIU
 INL
 Johns Hopkins U
 LANL
 LLNL
 Lodestar
 MIT
 Nova Photonics
 New York U
 ORNL
 PPPL
 Princeton U
 Purdue U
 SNL
 Think Tank, Inc.
 UC Davis
 UC Irvine
 UCLA
 UCSD
 U Colorado
 U Illinois
 U Maryland
 U Rochester
 U Washington
 U Wisconsin

T&T TSG



Culham Sci Ctr
 U St. Andrews
 York U
 Chubu U
 Fukui U
 Hiroshima U
 Hyogo U
 Kyoto U
 Kyushu U
 Kyushu Tokai U
 NIFS
 Niigata U
 U Tokyo
 JAEA
 Hebrew U
 Ioffe Inst
 RRC Kurchatov Inst
 TRINITI
 NFRI
 KAIST
 POSTECH
 ASIPP
 ENEA, Frascati
 CEA, Cadarache
 IPP, Jülich
 IPP, Garching
 ASCR, Czech Rep

Draft Topics on Theory/Modeling Needs (I)

- Develop a suite of synthetic diagnostics integrated with numerical codes
 - To facilitate turbulence measurement and theory/simulation comparison
 - Identify instabilities
 - Validate theories/models
 - To assist further diagnostic development
 - BES, High-k scattering, PCI, reflectometry, polarimetry and edge magnetic pick-up coils
- Develop interpretative and predictive capability for H-mode pedestal ($r/a > 0.9$)
 - Empirical/semi-empirical scaling of pedestal height & width with “engineering” parameters (I_p , B_T , n_e , Z_{eff}) and/or theory parameters (ν^* , β , ρ^*)
 - Development and validation of pedestal height models with data (EPED1, any others)
 - Pedestal turbulence (Local and global gyrokinetic, fluid codes, e.g. GYRO, XGC, BOUT++, GTS, GEM)
 - Predict microstability (KBM,...) thresholds in pedestal (linear gyrokinetics, any others)

Draft Topics on Theory/Modeling Needs (II)

- Develop interpretative and predictive capability for NBI-heated H-mode core-flat region ($r/a < \sim 0.4$)
 - Empirical/semi-empirical scaling of core T_e profile flattening with fast ion population, gradient, β_{fast} , etc...
 - Simulations of fast particle driven instabilities and associated transport
 - Development of reduced models (theory, semi-empirical, etc...) of χ_e , χ_ϕ and $D_{j||}$ for use in predictive simulations
 - The effect of turbulence spreading from H-Mode core gradient region ($r/a \sim 0.4-0.9$)
- Develop interpretative and predictive capability for H-Mode core gradient region ($r/a \sim 0.4-0.9$)
 - Identify 1D profile database for model validation from relevant discharges from NSTX/NSTX-U
 - Test TGLF (or develop other reduced models) against linear and nonlinear gyrokinetics for NSTX-relevant parameters, especially for ETG and/or micro-tearing dominant regimes
 - Develop reduced models with global effects
 - May need global, multi-scale simulations due to large spatial profile variations
 - Reconcile anomalous electron and momentum transport with neoclassical ion transport