

1. Inter-machine comparison and benchmark study of neoclassical transport simulations in Heliotron/Stellarator

- Using the experiment analysis (Dinklage IAEA2012), FORTEC-3D has been adopted for NC transport and ambipolar- E_r analyses in LHD, TJ-II, and W7-AS plasmas.
- By introducing new adaptive source/sink method, δf simulations in plateau regime plasmas in these 3 devices has successfully been done.
- In plateau regime, finite-orbit-width effect is not significant and changes slightly the prediction of amb. E_r . But the ion energy flux at the ion-root is found to differ by factor 2 comparing local-mono-energy and global simulations.

2. Neoclassical poloidal viscosity in biasing helical plasmas

- Analysis of the LHD biasing experiment in 2012 (several different magnetic axis positions) using FORTEC-3D is planned. (Takahashi, Kitajima, Satake)
- Poloidal flow measurement around the probe is now available (Tokuzawa).

3. FORTEC-3D code to be “open source”

- Source code is now shared with Velasco → apply to TJ-II, “direct” comparison and connection with DKES
- Also with Wisconsin group (in Oct.) → Neoclassical viscosity analysis in HSX
- Other possible collaborators : H-J, TU-heliac, PPPL and JAEA (RMP tokamak), ...

4. Publication and presentation related to the Flow & viscosity activity

ISHW 2013

- “Benchmark of local and non-local neoclassical transport calculations in Stellarator and Heliotron” Satake
- “Study of transition phenomena based on poloidal ion viscosity using a biasing electrode ...” Takahashi
- “Investigation of ion and electron heat transport of high-Te ECH heated discharges in LHD” Pablant

EPS 2013

- “Vanishing neoclassical viscosity and physics of the shear layer in stellarators” Velasco

PAPERS

- “Study of the neoclassical radial electric field of the TJ-II flexible heliac” Velasco, PPCF2012
- “Formation of Electron-Root Radial Electric Field and its Effect on Thermal Transport in LHD High T_e Plasma” Matsuoka, PFR 2013
- “Simulation studies of the ExB rotation on NTV in tokamaks with small magnetic perturbations” Satake, accepted to NF (IAEA 2012 presentation)
- “Kinetic simulations of the shear layer in stellarators” Velasco, submitted to POP

5. Others

- High-Z impurity neoclassical transport and the effect of $(dE \times B)_r$ drift on it
 - Collaboration of J. M. Garcia-Regana with Satake, V&V of simulation codes for this purpose (EUTERPE and FORTEC-3D)
- Applications of 3D NC transport code to ripple / RMP tokamak (JT-60SA, JT-60U)
 - Simulation of toroidal flow damping by neoclassical toroidal viscosity by weak magnetic field
 - “Simulations of toroidal rotation driven by the neoclassical toroidal viscosity in tokamaks” Honda, Suzuki, Satke et al., EPS2013