

# Report on the TORIC RF Component

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# Status of TORIC RF Component

- Are the components complete or if not when will they be?
  - TORIC RF Component with thermal electrons and ions is complete.
- What physics codes are incorporated?
  - TORIC RF component incorporates the FLR ICRF and the HHFW versions as a single code.
- Have they been tested and demonstrated to run in the framework and what tests have been done?
  - Component was tested and shown to run on the IPS framework with PS2.0.
    - EPA component was used to run TSC for an Alcator C-Mod discharge with high power minority ICRF heating [ $I_p = 600$  kA,  $B_0 = 5.4$ T, and  $f_0 = 80$  MHz].
    - CSTATE was used to examine the spatial deposition profiles and wave fields from the TORIC solver and compare them with AORSA calculations.

# Status of TORIC RF Component

- What validated runs are there that could be used for regression testing? Where are the needed input files?
  - Validated runs for C-Mod and ASDEX minority heating could be used for regression testing.
    - Namelist input, MHD equilibrium, and output files reside in the TORIC SVN repositories in Garching and MIT (and also in the SWIM repository).
- Are the physics binaries in the physbin directory on viz/mhd and Jaguar?
  - Yes for viz/mhd
  - Binary was present on Jaguar, needs updating, and is not in physbin.
  - *Executable also present at NERSC.*
- What does a user have to do to make the component work - input files, settings, etc ?
  - TORIC component expects the Plasma State to have an MHD equilibrium with plasma profiles.
  - Component expects a machine.inp file to be customized for machine specific RF parameters (antenna geometry).

# Status of TORIC RF Component

- What simulations are planned using the component:
  - Simulations of mode conversion current drive (MCCD) for sawtooth modification experiments in C-Mod.
    - Will use Ehst –Karney parameterization for CD.
- Are there extensions to the components planned? What is the schedule for these extensions?
  - Modify TORIC component for import of  $f(v)$  and export of  $D_{ql}$ , for coupling to Fokker Planck component.
    - By beginning of Year 2.
  - New simulations planned:
    - Re-do simulations of C-Mod minority heating using TSC and TORIC/CQL3D in the RF Component and compare with results from using AORSA/CQL3D.
    - Re-do simulations of ITER Scenario 2 using TSC – TORIC/CQL3D and compare with results obtained using AORSA/CQL3D in the RF Component.

# Status of TORIC RF Component

- How many distinct versions of the component are there and how many versions are planned?
  - One version of the TORIC component:
    - Minority heating, mode conversion, HHFW
    - Thermal ions and electrons (presently).