

Achievements and Plans for NCSX Coil Group

**S. P. Hirshman
Project Meeting – 12/19/00**

Achievements since last Project Meeting have been outstanding

- **Decision to concentrate on modulars has impacted our efforts**
 - **Strickler-Berry: COILOPT**
 - **Continue to produce new modular designs (7 coils; 7coils symmetric; 6 coils 2 fold symmetry)**
 - **Work coordinated well with engineering**
 - **Hudson-Strickler: COILOPT + PIES**
 - **Island suppression algorithm coupled to modular coil topology yielding results**

Smaller effort devoted to saddle improvements

- **Surface-Preserver code**
 - R. Woolley, A. Brooks
 - Eventually planned to circumvent PIES to compute island targets
 - Would be a BIG gain in computational turn-around time
 - Already benchmarked in vacuum
 - Benchmarking ongoing(?) for finite beta plasma
 - Merge with GA (W. Miner) ongoing (?)
 - Eventually applicable to COILOPT
 - replace Hudson/Strickler module

Major improvements to Optimizer should be incorporated into efforts

- **STELLOPT code now fully MPI**
 - D. Spong/S. Hirshman have put optimizer into MPI format
 - More stable than “forked” version
 - Fixed some LM-parameter logic errors – improved convergence results in some cases
- **FB Optimizer merge with COILOPT**
 - L. Berry/S. Hirshman have almost completed merge of FB optimizer + COILOPT
 - Directly optimize physics X^2 from coils

Plans for supporting PVR efforts

- **SPH needs *written* documentation**
 - Coil group participants (you KNOW who you are!) need to get writing “requests” (assignments) to SPH by end of year
- **Trim-coil activities need to be closely woven into the coil-group tapestry**
 - A. Brooks, R. Hatcher: utilize coil group codes and expertise to evaluate trim candidates
 - Interact with flexibility (Pomphrey) for guidance

Plans (cont'd)

- **Finite coil thickness effects**
 - A. Brooks has only looked at thickness impact for an older coil set, and only at physics impact (*not* surface quality)
- **PF Coil Set Regularization**
 - W. Reiersen calculations indicate this is a solvable problem
 - May want to include in optimizer