

Planning for the next ARIES Town Meeting: *“Edge Physics Modeling and Experimental Verification for Fusion Power Plants”*



M. S. Tillack



C. Kessel



A. Turnbull



*ARIES Project Meeting
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Motivation and Goals

■ Motivation

- We lack credible modeling capability for ARIES studies
- Insufficient attention has been paid to power plant specific needs
- Insufficient communication occurs between theoreticians, modelers, experimentalists and device designers
- We can help bring together the (international) community on this critical topic.

■ Goals and Outcomes

- Evaluate the current state of the art in numerical model development and experimental validations
- Establish the current best prediction of the edge physics conditions in a tokamak power plant
- Create a community of edge physics modelers and experimentalists
- Initiate a series of workshops (establish core organizers)
- Produce a journal article

Organization

1. Organizers

- M. S. Tillack (UCSD), C. Kessel (PPPL), A. Turnbull (GA)

2. Steering Committee

- A. R. Raffray (ITER IO)
- T. Rognlien (LLNL)
- G. Tynan (UCSD)
- F. Najmabadi (UCSD)

3. Additional members are desired, e.g.

- Dave Hill (DIII-D/LLNL)
- Rajesh Maingi (NSTX/ORNL)
- Bruce Lipschultz (C-Mod/MIT)
- David Coster (EU)
- Andre Kukushkin (ITER)
- Nobuyuki Asakura (JAEA)

Timing and Location

- 1. To be held on the campus of UCSD**
- 2. The week before PSI has emerged as the top choice**
 - PSI is May 24-28; Town Mtg will be May 19-21 or 20-21
 - This will probably increase international participation
 - The disadvantages of preceding PSI are considered tolerable
 - We can advertise on the PSI web site
 - <http://fusion.gat.com/conferences/psi2010>
- 3. Can we (should we) squeeze into 2 days?**

Topics are divided into 8 sessions

1. Opening Session, Background

- Welcome, logistics, meeting goals
- Overview of current ARIES study, definition of the reactor regime
- Definition of ITER's edge regime
- IHHFC town meeting summary and conclusions (optional)
- Guidance from ReNeW Theme III

2. Physics of the edge - current understanding and projections to ITER and power plants

- ELM's and ELM control
- Scrape-off layer physics
- Disruptions and off-normal events
- PMI

3. Innovative divertor concepts

- Super-X
- Snowflake
- Liquid metals
- EU or Japan contributions???

Topics and Sessions, continued

4. Modeling of the tokamak edge

- UEDGE, particle drifts, and kinetic effects
- ITER and Demo modeling with B2-Eirene
- SOLPS + PMI modeling
- neutrals modeling

5. Technology issues, constraints and modeling

- PMI
- neutrons and material limitations
- HHF
- control coils and their design implications

6. Experimental verification of models for power plants

- ReNeW angle on research gaps
- D-III D plans for model verification
- Alcator plans for model verification
- NSTX plans for model verification
- PISCES plans for model verification
- EU or Japan experiments

Topics and Sessions, continued

7. New devices

- the role of NHTX in edge physics verification
- the role of FDF in edge physics verification
- the role of CTF in edge physics verification

8. Working Group

(to discuss future plans, for those wishing to remain)

- Discussion
- Conclusions
- Documentation
- Next steps

Hospitality

- Morning and afternoon breaks
- Hosted dinner (?)
 - If dinner is hosted, then we will charge \$75~\$100 reg fee
 - Where to hold dinner?
 - Provide transportation to dinner?
- Should we designate a meeting hotel?

Planning Schedule

- Contact additional steering committee members and seek their advice (Jan '10)
- Contact potential speakers (Jan '10)
- Obtain blessing from DOE? (Jan '10)
- Create 1st draft and distribute 1st announcement (Feb '10)
- Finalize venue, lodging, dining plan, agenda (April '10)