

Toroidal Alternates FESAC Subpanel Update

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Outline

- Charge from Ray Orbach
- Panel membership
- Panel Process
- DFW meeting and following activities
- How you can help
- Website: <http://fusion.gat.com/tap>

Presented at the 2008 Innovative Confinement Concepts Workshop
University of Nevada, Reno. June 25, 2008

Charge to FESAC From Dr. Ray Orbach

- **Focus on Four Toroidal Confinement Concepts**
 - ST, Stellarator, RFP, CT(FRC and spheromak)
- **For those concepts that are seen to have promise for fusion energy, please identify and justify a long-term objective for each concept as a goal for the ITER era.**
 - ITER era: when ITER operates (~ next 15-20 years)
 - All of these have promise, but some are closer to reaching fusion conditions
 - Iterative process with community to identify ITER-era goal
 - Reasonably aggressive and focused goals
- **With that[goal] in mind, I ask that FESAC:**
 - 1 critically evaluate the goal chosen for each concept, and its merits for fusion development;
 - 2 identify and prioritize scientific and technical questions that need to be answered to achieve the specified goal;
 - 3 assess available means to address these questions; and
 - 4 identify research gaps and how they may be addressed through existing or new facilities, theory and modeling/computation.
- **Identify and prioritize the unique toroidal fusion science and technology issues that an alternate concept can address, independent of its potential as a fusion energy concept.**

Orbach Charge to Panel – Cont'd

- “With that[goal] in mind, I ask that FESAC:
 1. critically evaluate the goal chosen for each concept, and its merits for fusion development;
 2. identify and prioritize scientific and technical questions that need to be answered to achieve the specified goal;
 3. assess available means to address these questions; and
 4. identify research gaps and how they may be addressed through existing or new facilities, theory and modeling/computation.”
- OFES exists within the office of science
 - Astrophysics, HEP address the fundamental science of natural systems
 - FES addresses scientific research motivated by the fusion goal:
“establishing the knowledge base for future fusion energy sources”
- What scientific questions must be answered to bring a given concept to the point where we are ready for its version of ITER (burning plasma) or equivalent contribution?
 - Which questions are the highest priority and what metrics apply to the prioritization?
- How will fusion scientists answer these questions using existing capabilities? Do these questions motivate new facilities, technology, codes/simulation, or theory?

Panel Members Represent a Broad Cross Section of Experts From the Fusion Community

FESAC Toroidal Alternates Panel

David Anderson	University of Wisconsin	dtanders@facstaff.wisc.edu
Jeff Freidberg	MIT	jpfreid@mit.edu
Martin Greenwald	MIT	g@psfc.mit.edu
Houyang Guo	RPPL @ U. Washington	guo@rppl.aa.washington.edu
Rich Hazeltine (VC)	U. Texas	rdh@physics.utexas.edu
Dave Hill (Chair)	LLNL	hilldn@fusion.gat.com
Bick Hooper	LLNL	hooper1@llnl.gov
Hantao Ji	PPPL	hji@pppl.gov
Tim Luce	General Atomics	luce@fusion.gat.com
Dale Meade	FIRE	dmeade@pppl.gov
Jon Menard	PPPL	jmenard@pppl.gov
Martin Peng	ORNL	pengym@ornl.gov
John Sarff	U. Wisconsin	jssarff@facstaff.wisc.edu
John Sheffield	ISSE @ U. Tennessee	jsheff1@utk.edu
Xianzhu Tang	LANL	xtang@lanl.gov
Ed Thomas	Auburn U.	etjr@physics.auburn.edu
Mike Zarnstorff	PPPL	zarnstorff@pppl.gov

- Universities, Labs, and Industry
- Experiment and theory
- 8 Concept Experts
9 At-large members
6 FESAC members
- Panel members bring
 - Recognized contributions to fusion science
 - Program management experience
 - Experience on similar panels
- Neither shy nor stubborn

Panel Process

- Panel discussions by email and teleconference to formulate overall process
- Panel organized into four Concept Working Groups to lead technical analysis: ST, Stellarator, RFP, and CT

Working Groups Bring Requisite Focus To Each Concept

Panel Members	ST	Stellarator	RFP	CT	At Large
Dave Hill (C)					X
David Anderson		E(L)			
Jeff Freidberg				AL	X
Martin Greenwald	AL				X
Houyang Guo				E(L)	
Richard Hazeltine (VC)	Th	Th			X
Bick Hooper				E	
Hantao Ji			E(L)		
Tim Luce		AL			
Dale Meade			AL		X
Jon Menard	E				
Martin Peng	E(L)				
John Sarff			E		
John Sheffield	AL				X
Xianzhu Tang			Th	Th	X
Ed Thomas		AL			X
Mike Zarnstorff		E			
Totals	5	5	4	4	9

- Working groups consist of concept experts and at-large members
- Working group experts know the research community for their concept
- At-large members facilitate communication to larger fusion community

Panel Process – Cont'd

- Panel discussions by email and teleconference to formulate overall process
- Panel organized into four Concept Working Groups to lead technical analysis: Stellarator, ST, RFP, and CT
- Panel needs advice from fusion community to function well
 - Written input provided by concept advocates and researchers
 - Interactive process (not an exam)
 - Previous panel reports and program reviews provide perspective
 - Open solicitation for anyone to submit written input via website
 - Concept presentations to the Panel (6/30–7/2 @ DFW Wyndham)
 - 2 hr blocks for each concept (60min presentation, 60min discussion)
 - Invited speakers addressing questions from panel working groups
 - 1 hr for brief public comments each day by request
 - Presentations are open to the public

[View all input at http://fusion.gat.com/tap/community](http://fusion.gat.com/tap/community)

Toroidal Alternates Panel Meeting Agenda

Wyndham Hotel North Dallas Fort Worth Airport

June 30-July 2

- **Monday June 30**

- 8:30–10:00 Panel preparatory discussion on ST and stellarator
Break
- 10:00–12:00 ST Goals, Issues, Gaps ([Public meeting](#))
- 12:00–1:30 Lunch
- 1:30–3:30 Stellarator Goals, Issues, Gaps ([Public meeting](#))
Break
- 3:30–4:30 [Public comment session](#) (by prior request)
- 4:30–6:00 Panel discussion of presentations, goal evaluation methodology

- **Tuesday July 1**

- 8:30–10:00 Panel preparatory discussion on CT and RFP
Break
- 10:00–12:00 CT Goals, Issues, Gaps ([Public meeting](#))
- 12:00–1:30 Lunch
- 1:30–3:30 RFP Goals, Issues, Gaps ([Public meeting](#))
Break
- 3:30–4:30 [Public comment session](#) (by prior request)
- 4:30–6:00 Panel discussion of presentations, issue prioritization methodology

- **Wednesday July 2**

- 8:30–11:30 Working Group Discussions
- 11:30–12:15 ST and stellarator Working Group reports (20 min each)
- 12:15–1:15 Lunch
- 1:15–2:00 CT and RFP Working Group reports (20 min each)
- 2:00–3:00 Discussion of cross cutting issues and report contents

All meetings in Lindberg II room

Panel Activities Following DFW Community Input Meeting

- Concept Working Groups will be digesting input and formulating findings and recommendations throughout June and July
- Panel meeting in early August immediately following FESAC meeting.
- Panel aims to draft report during August and September
- Report is submitted to FESAC.
- Report is not official until approved by FESAC.

OFES will be scheduling workshops in FY09 to develop research plans to address high priority issues identified in the panel report

General Report Structure and Emphasis

- Assessments are primarily concept by concept
 - Each concept will be evaluated relative to its ITER-era goals, rather than to its ultimate relative reactor advantages, which are well known but may be difficult to achieve in practice
 - Each concept faces significant scientific and technical challenges in meeting its own ITER-era goals
 - direct comparisons between concepts will be limited in scope
- The ITER-era goals motivate uniquely prioritized research
 - We will use a common basis for evaluation where appropriate (e.g., definition of β , confinement time, and etc., see TAP website)
 - We will identify unique contributions to fusion science for all concepts
- We are focused on the scientific issues which must be resolved to make progress, and the types of facilities needed for the work, not the budget requirements for the program.

How You Can Influence our Report

- Read the charge and talk about it with your colleagues.
- Read and discuss the existing input on ITER-era goals and issues, facilities and gaps provided by your colleagues and posted on the TAP website.
- Read and discuss the questions from the Panel back to the authors of the community input documents (also on the TAP website).
- Offer to help the DFW presenters as they prepare to address the panel questions (time is very short).
- If you feel that the existing material misses an important point, have a different viewpoint, or want to comment on the panel process, please submit your own input to the TAP website.
- Stay in the loop: talk to concept advocates and check the TAP website for new material. **Provide input by August 5th to have greatest impact.**