

May 22, 2008

Dear Colleague,

We know that many of you are involved in preparing written input for the Toroidal Alternates Panel including the 10-15 page documents requested from each of the four concepts (ST, stellarator, RFP, and CT) and shorter (~2page) documents to be submitted via the Panel's website. We did not specify a particular format for the longer papers, but as the Panel has been working we have developed a sense of how we might structure chapters of our report dealing with each of the four concepts. We include this working outline for these chapters at the end of this message, which you may find helpful as you complete your report.

Other additional information coming from Panel discussions that you may find helpful at this point:

*Length of written input on concepts:* We have requested succinct reports and asked authors to avoid lengthy introductory remarks, as the essential benefits of the concepts are well known. If it takes a few extra pages to be clear about the issues and gaps, that is OK.

*Web-based community wide input:* The Panel's website provides an opportunity for anybody in the community to provide additional input, including alternate viewpoints on goals and key physics issues for concepts, gaps, and required facilities. Here too, shorter is better, but we are not enforcing a strict page limit: clarity is key.

*Presentations at the Panel meeting June 30-July 1:* The Panel is planning on hearing from selected speakers during its meeting in Dallas. The purpose of these presentations will be to clarify the panel's understanding of goals, issues, and gaps. Concept advocates will be receiving feedback/questions from the panel based on the written input, so we anticipate that these presentations will not be simply a review of the previously submitted material. We are planning on 2 hour blocks with the panel for each concept, with no more than 3 speakers and no more than an hour's worth of viewgraphs (40 slides including titles and outlines). These presentations will be open to the public, though space will be limited. More details will follow as the meeting arrangements are finalized.

*Goals, Issues, Gaps, and Facilities:* We encourage concept advocates to be clear about their goals for the ITER era (15-20 year time frame). We feel that statements such as "demonstrate that concept X makes a good fusion reactor" or "demonstrate that the physics of the X is sound" are too general to be informative. We are looking for goals that motivate prioritized research on clearly identifiable issues. What are the "showstoppers" for concept X? With regard to facilities, we are looking for information defining fundamental capabilities needed to address the high priority technical issues and not specific embodiments of experimental devices. Using Advanced Tokamak development as a model, we are looking for statements like, "a tokamak demonstrating high fusion gain  $G = \beta_N H / q_{95}^2$  sustained for  $3\tau_R$  by fully non-inductive current drive," as opposed to "a Cu-magnet tokamak at  $R=2.5m$  with 12MW of LHCD and 20sec pulse length such as the proposed HGFNICDTX."

This letter will also be posted on the Panel's website: <http://fusion.gat.com/tap>. You can also contact members of the panel if further information is needed.

David Hill for the FESAC Toroidal Alternates Panel

## Working Outline for Report: Concept Chapters

### 1. Concept description. (1 page)

Review distinctive features of device:

- Key unique elements of magnetic configuration
- Potential advantages and main challenges
- Long-term goals ("vision statement")

### 2. Goals for the ITER era and their merit. (3 pp)

- Statement of ITER-era goal(s). Preferably a single goal, but no more than 2 or 3 prioritized goals. The text should provide concreteness and realism, without specifying milestones.
- Evaluation and assessment of goal(s): scientific value, credibility, accessibility.
- Discussion of broader rewards for science gained.

### 3. Scientific and technical issues needed to reach goals. (3-4 pp)

- Concise statement of prioritized KEY scientific and technical issues, each described briefly.
- Discussion of the plasma parameters and conditions that would be needed to resolve these issues (e.g., collisionality,  $S$ , current drive efficiency, transport,  $\beta$ , and etc.)
- Status of research involving these issues.

### 4. Facilities and gaps. (3-4 pp)

For each issue listed in Sec. 3, provide description of

- Facilities available to address it, including devices, programs, codes...
- Gaps: issues or parts of issues that cannot be addressed by present facilities now operation or under construction
- New facilities needed to address the gaps, required relevant physics-based parameters and scale of such facilities, and readiness to proceed
- A summarizing table or matrix would probably help here.