

April 22, 2008

Dear Colleague,

The newly formed FESAC panel, charged to assess toroidal alternate concepts for magnetic fusion, is beginning its work. The panel has been asked to “critically evaluate the status of, and scientific opportunities for, major alternate magnetic confinement configurations,” which are the stellarator, the spherical torus, the reversed field pinch, and compact tori (spheromak and field-reversed configurations).

Specifically, the panel has been asked to “identify and justify a long-term objective for each concept as a goal for the ITER era,” i.e., the next 15-20 years. Further, the panel has been asked to

- 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.”

Finally, the charge asks us to “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.” A copy of the complete charge letter is attached.

We are asking for your help as we gather information to address Dr. Orbach’s charge to FESAC by providing us a succinct report (10-15 pages) in response to the key elements of the charge as outlined above. *We are seeking one report per concept at this time, so we encourage the groups working on related concepts to work together on this.* The CT groups may want to consider separating spheromaks and FRCs. The scope of the charge includes theory, computation, and any necessary supporting technology. If it seems best to produce several shorter documents on the concept in order to provide input sooner, that would fine (i.e., one document to define goals and one to define discuss other elements of the charge). We hope to use this input to inform our panel discussions over the next couple of months. We would like to receive these by the end of May 2008 at the latest.

In addition to this request for written input from each of the concepts, we are planning on making a more general call to the broader fusion community for 2-page web-based submissions and will be inviting representatives from each concept to meet with the full panel, most likely in early July. Overall, we expect this to be an iterative working process between the panel and concept advocates; representative experts from each of the four concepts on the panel can help facilitate these interactions. Therefore, it’s not necessary to perfect your input before submitting it.

We are now studying existing information on the four concepts contained in prior FESAC reports (these can be found on the panel’s web site (<http://fusion.gat.com/tap>) as we determine next steps in our work. You may want to review these as you prepare your input, in particular, the two-page summaries of concepts from the 1999 FESAC panel report, which gives a 5 year and 20 year view for each concept.

Please feel free to contact others on the panel or me directly if you have questions.

David N. Hill (Panel Chair)