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Macroscopic Stability Research on NSTX and a ReNeWed Future (ReNeW Slides)

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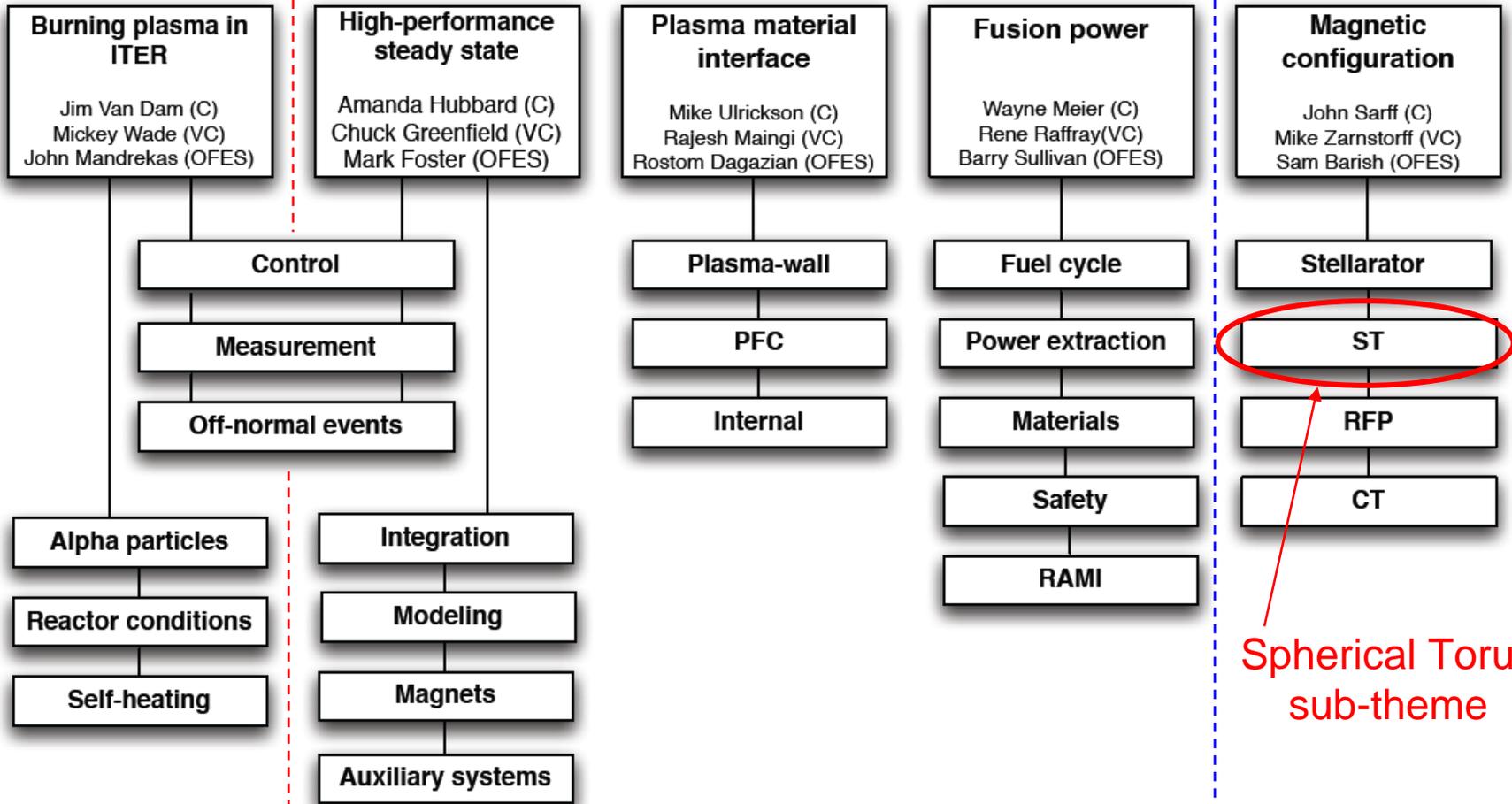
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**(from) Columbia APAM Plasma Physics
Colloquium talk
February 6, 2009**

Columbia University, New York, NY

Culham Sci Ctr
U St. Andrews
York U
Chubu U
Fukui U
Hiroshima U
Hyogo U
Kyoto U
Kyushu U
Kyushu Tokai U
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TRINITY
KBSI
KAIST
ENEA, Frascati
CEA, Cadarache
IPP, Jülich
IPP, Garching
ASCR, Czech Rep
U Quebec

ReNeW organized into 5 fusion research themes



Structure/gaps
Energy Policy Act
task group report

Structure/gaps
Priorities, Gaps, and Opportunities Panel Report
("Greenwald Report")

Spherical Torus
sub-theme

Structure/gaps
FESAC Toroidal
Alternates Panel
Report

Reports available at: <http://burningplasma.org/renew.html>

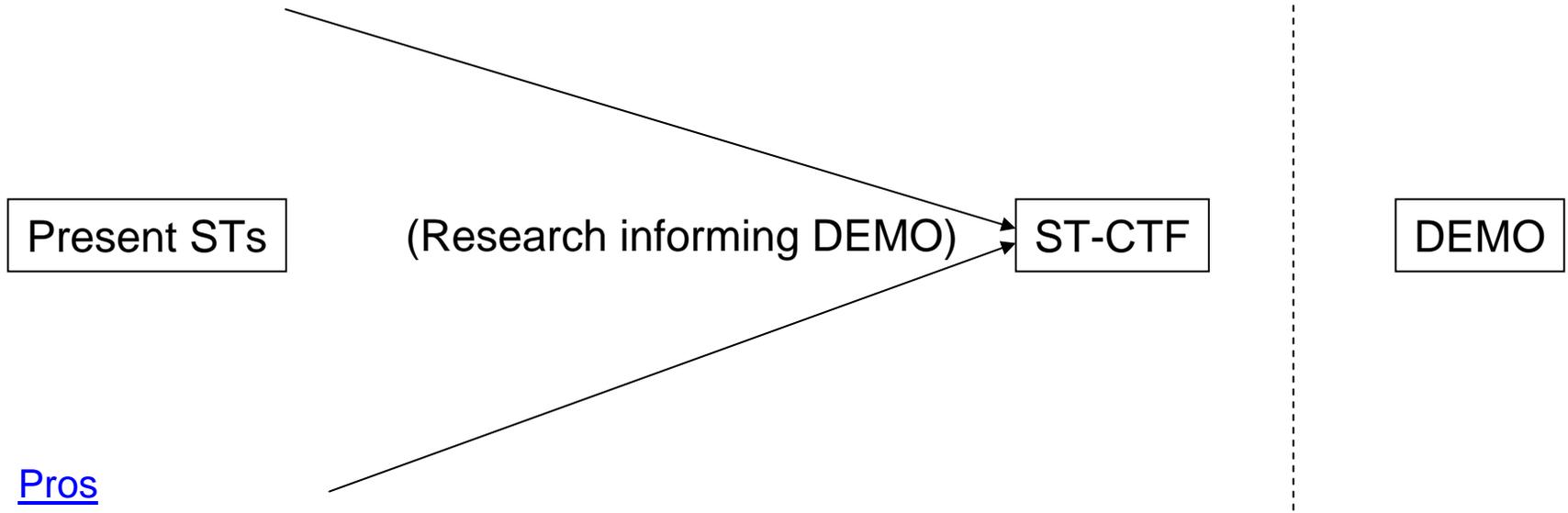


ReNeW ST Panel is on Schedule to Complete Tasks

- ❑ Tasks through March 16-19 Workshop
 - ❑ **Solicit community input:** (First call for input DONE – continue to engage community)
 - ❑ **Review issues as described in TAP panel report:** (DONE: embodied in community distributed draft of ST section V1.7)

***** WE ARE HERE *****
 - ❑ **Identify scientific research needed to address the issues**
 - Review and expand on research outlined in the TAP panel report
 - Draft write-up of research requirements, make available to community
 - Fold in community input on research requirements
 - ❑ **Develop draft “research thrusts” for discussion at March workshop**
- ❑ FESAC TAP Report Mission statement: *Establish the ST knowledge base to be ready to construct a low aspect ratio component testing facility that provides high heat flux, neutron flux, and duty factor needed to inform the design of a demonstration fusion power plant.*

Interpretation of the FESAC TAP document by some people in the community



❑ Pros

- ❑ ST-CTF focus

❑ Cons

- ❑ Alienates a significant part of the community (research plan has been characterized by some (to quote) as a “dead end”), so loses potential constituency
- ❑ Many have complained that several physics issues have been “swept under the rug”, even at the level of an ST-CTF device
- ❑ Interpreted as above, it doesn’t maximize cross-cutting with other magnetic fusion research

Key point: Let’s engage the community and make appropriate, small changes to strengthen these weak points.



(STRAWMAN) U.S. ST Research Vision consistent with Present ST Mission Statement

Research

Scientific Research during ITER era informing DEMO

Tier 1

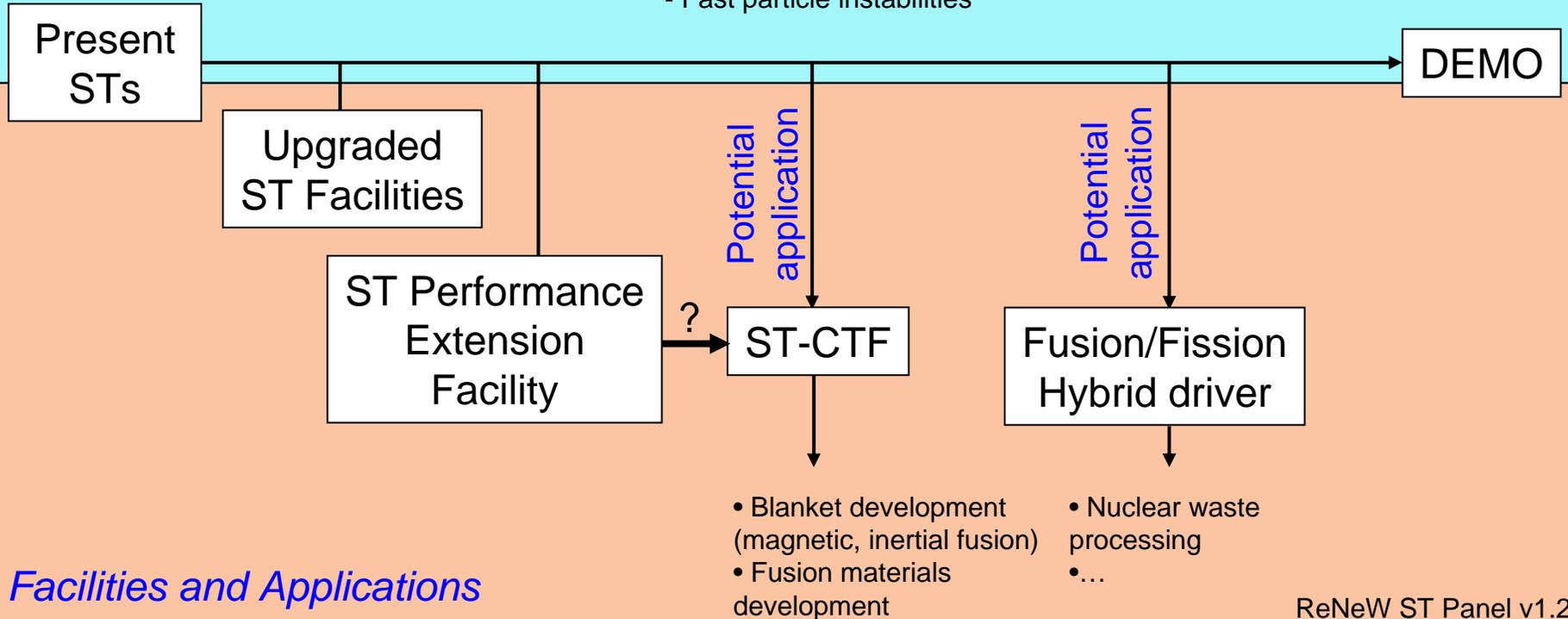
- Start-up and Ramp-up
- Plasma-material interface
- Electron energy transport
- Magnets

Tier 2

- Stability & SS Control; 3D fields
- Disruptions
- Heating & current drive
- Ion-scale transport
- Fast particle instabilities

Tier 3

- NTMs
- Continuous NBI systems



Facilities and Applications

ReNeW ST Panel v1.2

Several Conduits for Participation in ReNeW Process

- ❑ ReNeW Forum (web bulletin board)
 - ❑ Contribute to open discussions; start your own discussions
 - ❑ Registration instructions: <http://burningplasma.org/forum/>
 - Request authorization to ReNeW Forum: e.g. email: sabbagh@pppl.gov
 - ❑ ST topic: <https://burningplasma.org/forum/index.php?showforum=114>
- ❑ ST Group: Direct input to/discussion of evolving draft ST section of document
 - ❑ Posted: <https://burningplasma.org/forum/index.php?showtopic=653>
- ❑ Submit short white papers describing your ideas on how to resolve key issues, support/define research thrusts
 - ❑ Download directions at: <http://burningplasma.org/renew.html>
- ❑ Participate in March 2009 Workshops
 - ❑ Links to websites with info/registration at: <http://burningplasma.org/renew.html>
- ❑ Directly contact panel members
 - ❑ ST Group: 10 Panel members (see next page); more than 30 advisors



ReNeW Spherical Torus Panel Members

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Martin Peng	ORNL	(865) 368-0917	pengym@ornl.gov

- ❑ Contact any panel member for authorization to access the ReNeW Forum (website bulletin board)
- ❑ Full advisor list posted at:
<https://burningplasma.org/forum/index.php?showtopic=636>