

Plans for Emerging Fusion Concepts Working Group

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DFW

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Overview

The Emerging Concepts Working Group will address issues related to nurturing innovative approaches to fusion science.

There are four Subgroups: Reactor, Physics, Next Step, and Technical Opportunities.

Reactor Physics (Jim Hammer, Dick Siemon)

Key Areas of Focus

- Long-term physics and technology vision for each emerging concept as a fusion reactor system

Key Questions

- What advantages and what technical challenges does each EC enjoy/face in its reactor embodiment?
- What are the critical physics and technology components for each EC's development toward a reactor, and what is the sensitivity to changes in these components?

Plasma Physics Issues for EC's (Adil Hassam, Jay Kesner)

Key Areas of Focus

- Physics issues for emerging concepts

Key Questions

- What are the MHD issues unique for EC's?
- What questions should be studied in the area of plasma relaxation and self-organization? What applications exist for relaxation (e.g. current drive)?

Plasma Physics Issues for EC's (Adil Hassam, Jay Kesner)

Key Questions (Cont.)

- What is the role of strongly nonthermal particle populations and/or large-orbit ions in EC's?
- How can large electrostatic fields be used for plasma confinement? What other nonmagnetic fusion concepts exist and how can they be studied?
- What are the unique physics issues associated with $\beta \gg 1$ plasmas?

Next Step Concept Development (Alan Hoffman, Bick Hooper)

Key Areas of Focus:

- Discuss and define the next development steps for emerging concepts and metrics for these developments

Key Questions:

- What level of performance should an EC demonstrate to make the scientific case for a Proof-of-Principle level experiment?
- Which critical issues of Topic 1B will be addressed and in what manner in a Proof-of-Principle experiment?
- What new opportunities exist for Exploratory Concept level programs?

Technical Opportunities for EC's (George Miley, John Slough)

Key Areas of Focus:

- What technical opportunities exist to leverage Emerging Concepts science by applications outside of fusion power generation?

Key Questions:

- What is/will be the impact of EC research on physics areas outside of fusion and by nontraditional applications of EC science/technology?
- What are the plasma/wall and energy extraction issues relevant to EC?

Technical Opportunities for EC's (George Miley, John Slough)

Key Questions (Cont.):

- What possible "out-of-the-box" reactor approaches exist within present or future EC research (e.g. liquid or sacrificial walls, nonignited systems, advanced/polarized fuel, direct conversion)?

RFP

Spheromak

FRC

Dipole

Centrifugal

MTF

Mirrors

Flow α -pinch

Ion Rings

Electrostatic

Cross-section Enhancement

Information Gathering

- prepare electronically

- presenter

- reviewer

- discussion

} plenary

Synthesis

breakout

Strawman Schedule

	Mon	Tues	Wed	Thrs	Fri	Mon	Tues	Wed
8:30	Plenary Speakers	Concept Review X-Section	Concept Review Ion Rings	Joint with MF ² Concept Review Spheromak	Next Step POP Proposal Discussion	Plenary Summaries	Group discussion	breakout groups
9:00		Fast-Ignitor	Centrifugal		Metrics for POP and Ex Concepts		breakout groups	
9:30		Electrostatic	Dipole	RFP				
10:00		Panel	Panel	Panel				
10:30		BREAK	BREAK	BREAK	BREAK			
11:00		Concept Review Mirrors	Concept Review FRC	Joint with MF ² Rapporteur other magnetic concepts	Tech. Opps.			
11:30		Flow Z-Pinch	MITF	breakout groups with MF ²				Breakout group Summaries
12:00		Panel	Panel					WG Summary working session

Tues. Reviews

Concept	Presenter	Reviewer	Panel – discussion
PRC	8:30-8:55 Hoffman	8:55-9:10 Majewski	9:10-9:30
Dipole	9:30-9:55 Kessner	9:55-10:10 Schaeffer	10:10-10:30
Break		10:30-10:40	
Ion rings	10:40-10:55 Greenly	10:55-11:05 Pinn	11:05-11:20
Electrostatic	11:20-11:35 Baracs	11:35-11:45 Nevins	11:45-12:00

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Weds. Reviews

Concept	Presenter	Reviewer	Panel+ discussion
MTV	8:30-8:55 Simon	8:55-9:10 Boozer	9:10-9:30
Flow through pinch	9:30-9:45 Hartman	9:45-9:55 Polliver	9:55-10:10
Break		10:10-10:20	
Microns	10:20-10:35 Rytov	10:35-10:45 Sheffield	10:45-11:00
Centrifugal trap	11:00-11:15 Hassam	11:15-11:25 Beck	11:25-11:40
Cross section enhancement	11:40-11:55 Perkins	11:55-12:05 Kulsrud	12:05-12:20

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Thrs. Reviews

Concept	Presenter	Reviewer	Panel Discussion
RFP	8:50-8:55 Tragel	8:55-9:10 Schoenberg	9:10-9:30
Spheromak	9:30-9:55 Hirner	9:55-10:10 Synakowski	10:10-10:30
Break		10:30-10:40	
Summary of other Emerging Concepts	10:40-11:10		11:10-11:30

Needs/Concerns

Web page - available 6/16

Communication:

- Update Conveners list
- Update Mihel mail list
- 2 papers from FESAC

Coordination

- With MF (✓)
- With TW (MTF, fast ignitor)
M Dan, Craig discuss
- With EY
M Dan Steiner, George Miley
coordinate

Not enough time, man!

Coffee or Strike