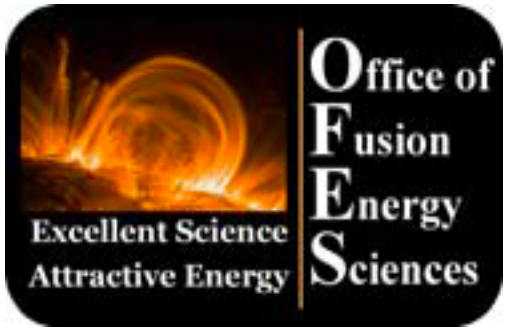
U.S. DEPARTMENT OF ENERGY



Welcome and Opening Remarks

FESAC Meeting

Friday 17 July 2015

3:00am – 5:00pm (Eastern time)

Mark Koepke, *West Virginia University*

FESAC Chair

Announcement

In June, FESAC bid farewell to four members, thank you for your service!

- **Bruce Cohen**, Lawrence Livermore National Laboratory
- **Robert Rosner**, University of Chicago
- **Christopher Keane**, Washington State University
- **Steve Zinkle**, University of Tennessee

FESAC welcomes four members whose terms will run through 2 June 2018. We look forward to your service after forms are submitted, your briefing has taken place, and you've been sworn in.

- **Bob Cauble**, Lawrence Livermore National Laboratory
- **Steve Knowlton**, Auburn University (retired)
- **Kristina Lynch**, Dartmouth College
- **Brian Wirth**, University of Tennessee

To the continuing members of FESAC, thank you for your continuing service!

Agenda features the presentation and discussion of the Non-Fusion Applications (NFA) subcommittee report

3:00 – 3:10pm: Welcome Remarks to FESAC (Mark Koepke, FESAC Chair)

3:10 – 3:15pm: Introduction of NFA Subcommittee (Don Rej, acting FESAC Chair)

3:15-3:35pm: Presentation to FESAC of the Subcommittee Report on Non-Fusion Applications (Amy Wendt, NFA Subcommittee Chair)

3:35-4:15pm: Question, Answer, Discussion (Don Rej, Amy Wendt, Subcommittee members)

4:15-4:30pm: Vote on Report Approval (Don Rej)

4:30-4:45pm: Public Comment Session (Mark Koepke)

Speakers wishing to present should email
Dr. Sam Barish (sam.barish@science.doe.gov) *to be put on the session schedule.*

4:45-5:00pm Friday: Any Other Business(Mark Koepke)

5:00pm: Adjourn

Example of how the NFA report might be used beyond responding to the FESAC charge

OFFICE OF HIGH ENERGY PHYSICS

Office of Science HEP

Particle Physics: Benefits to Society

From the earliest days of high energy physics in the 1930s to the latest 21st century initiatives, the innovative ideas and technologies of particle physics have entered the mainstream of society to transform the way we live. Selected examples illustrate a long and growing list of beneficial practical applications with contributions from particle physics.

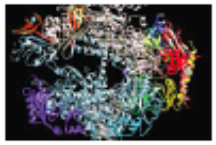
Medicine: cancer therapy
Every major medical center in the nation uses accelerators producing x-rays, protons, neutrons or heavy ions for the diagnosis and treatment of disease. It is estimated that there are over 7,000 operating medical linacs around the world that have treated over 30,000,000 patients.

Medicine: diagnostic instrumentation
Particle detectors first developed for particle physics are now ubiquitous in medical imaging. Positron emission tomography, the technology of PET scans, came directly from detectors initially designed for particle physics experiments sensing individual photons of light.

Homeland security: monitoring nuclear waste nonproliferation
In nuclear reactors, the amount of plutonium builds up as the uranium fuel is used. Because plutonium and uranium emit different kinds of particles, a particle detector can be used to monitor and analyze the contents of the nuclear reactor core. A prototype detector, originally developed by physicists for experiments, has already demonstrated the potential use of this new monitoring technology.

Industry: power transmission
Cables made of superconducting material can carry far more electricity than conventional cables with minimal power losses. Further superconducting technology advances in particle physics will help advance this industry, offering an opportunity to meet continued power needs in densely populated areas where underground copper transmission lines are near their capacity.

http://science.energy.gov/hep/benefits-of-hep/



Industry: biomedicine and drug development
Biomedical scientists use particle physics technologies to decipher the structure of proteins, information that is key to understanding biological processes and healing disease. A clearer understanding of protein structure allows for the development of more effective drugs, such as Kaletra, one of the world's most-prescribed drugs to fight AIDS.

Industry: understanding turbulence
From long distance oil pipelines to models for global weather prediction, turbulence determines the performance of virtually all fluid systems. Silicon strip detectors and low-noise amplifiers developed for particle physics are used to detect light scattered from microscopic particles in a turbulent fluid, permitting detailed studies of this challenging area.

Computing: the World Wide Web
Particle physicists developed the World Wide Web to give them a tool to communicate quickly and effectively with colleagues around the world. Few other technological advances in history have more profoundly affected the global economy and societal interactions than the Web. In 2001, revenues from the World Wide Web exceeded one trillion dollars, with exponential growth continuing.

Computing: the Grid
The Grid is the newest particle physics computing tool that allows physicists to manage and process unprecedented amounts of data across the globe by combining the strength of hundreds of thousands of individual computing farms. Industries such as medicine and finance are examples other fields that also generate large amounts of data and benefit from advanced computing technology.

Sciences: synchrotron light sources
Researchers use the ultra-powerful X-ray beams of dedicated synchrotron light sources to create the brightest lights on earth. These luminous sources provide tools for such applications as protein structure analysis, pharmaceutical research, materials science and restoration of works of art.