

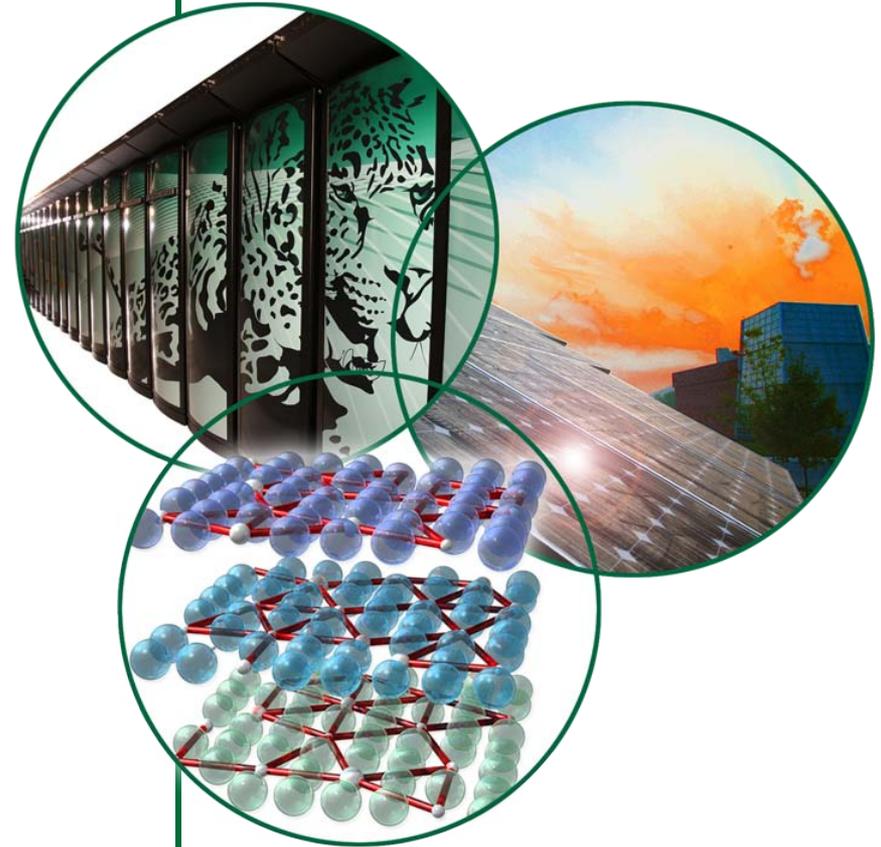
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Virtual Laboratory for Technology
For Fusion Energy Science

VLT Report the fusion trend line

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<http://vlt.ornl.gov/>

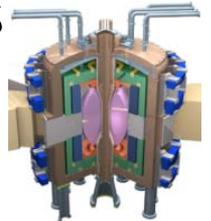


Recent events portend a bright future for our community – “input phase”

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- 2007: Greenwald report on Priorities, Gaps and Opportunities identifies glaring gaps in materials, fusion nuclear sciences etc.
 - 9 of 15 gaps are technology specific, component qualification facility identified
- June 2009: ReNeW identifies required research and facilities including an FNSF (integrated fusion environment)
 - VLT well represented in all five themes and especially in 3 and 4
- August 2009: FNSF advocates (GA, ORNL) brief Ed Synakowski
- December 2009: Kurtz et al. and Nygren et al. brief Synakowski
 - materials and fusion nuclear science and technology ReNeW findings



Somebody is listening.

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- **March 2010: “Emergent FES Vision” unveiled at FESAC**
 - *“There are clear directions in which we need to move.”*
 - High level goal 2 *“Materials in a fusion environment”* includes PMI effects, nuclear effects on materials and structures and harnessing fusion power
 - *“This requires the launching of a vigorous materials and nuclear science program that will be part of defining and constructing a fusion nuclear science facility, and will fill gaps en route to a DEMO. Synergies will be identified and levered between MFE, IFE, advanced nuclear energy, and defense”*
- **May 2010: America Competes Act reauthorization**
 - *FES Director with NE Assistant Sec. shall carry out materials R&D activities to identify, characterize and create materials that can endure neutron, plasma and heat fluxes in a commercial power plant.*
 - *Secretary to provide an assessment of 1) the need for a facility to test fusion and next generation fission materials and enabling technologies relevant to power plants and 2) the feasibility of a single new facility to address MFE, IFE and next generation fission materials research needs.*

Somebody is listening.

- **July 2010: FNS Pathways study kick off**
 - *Rollback (forward?) from DEMO to identify research requirements and define initiatives and proposal calls.*
 - *Materials broadly defined to include: plasma boundary conditions, PMI, nuclear effects on materials and structures, and harnessing fusion power.*
 - *“Cap this line of research with a major facility, operating in parallel with ITER, but our near term priority is the requisite research program prior to such a facility.”*
- **July 2010: Senate subcommittee language for FES**
 - *“To successfully harness fusion energy, scientists and engineers must design and build reactor components that can withstand extreme radiation environments and temperature. Since these extreme environments and material needs are common to both magnetic and inertial fusion energy, the Committee encourages DOE to reassess its materials science program and establish a program that would explore science, engineering, and materials issues for both magnetic and inertial fusion energy and build U.S. expertise.”*
- **July 2010: ITER Council approves project baseline**
 - *ITER motivates the development of plasma control technologies (heating, fueling, disruption and ELM control, T systems, PFCs)*
 - *Provides an opportunity for TBM down the road*

But there is no free lunch. We need your attention on the newest “opportunities”.

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- Pathways study activities (Abdou, Najmabadi, Tillack, Kurtz, Nygren, Tynan, Minervini, Milora et al.)
 - *Need to prepare a list of what constitutes the most generic R&D for FNST, including PFC/PMI and clearly related topics that don't fall precisely in FNST*
- International Collaboration Working Group (Zanstorff, Humphries, Kessel, Luce, Milora, Sabbagh, Whyte)
 - *Evaluate and prioritize opportunities for US collaborations to*
 - *prepare for US participation in ITER*
 - *address issues and gaps discussed in ReNeW report*
 - *Facilities: EAST, LHD, KSTAR, JET, JT60A, W7X*