U.S. DEPARTMENT OF ENERGY | Office of Science

The DOE-HEP Accelerator R&D Stewardship Program

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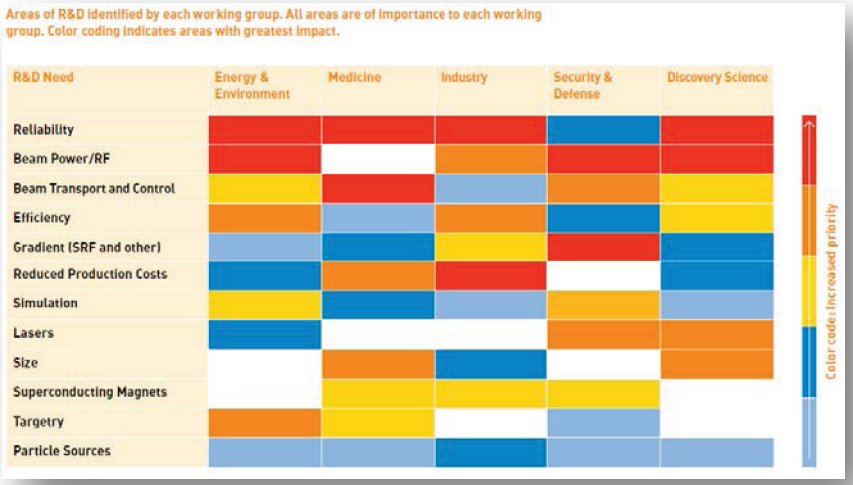
Outline

- **What are the origin and motivation for Accelerator R&D Stewardship?**
- **What IS "Accelerator R&D Stewardship"?**
- **How will the program start?**
- **What is the longer-term vision?**
- **How can you engage?**
- **Take-home messages**

2010: Accelerators for America's Future Report

Identified the importance of accelerator technologies to sectors of the US economy

- discovery science, medicine, energy and environment, national security, industry
- "…called for **greatly improved** interagency, interprogram, and industry-agency **coordination**."
- "…strongly highlighted the value of expanded **training and education** of accelerator scientists and engineers…"



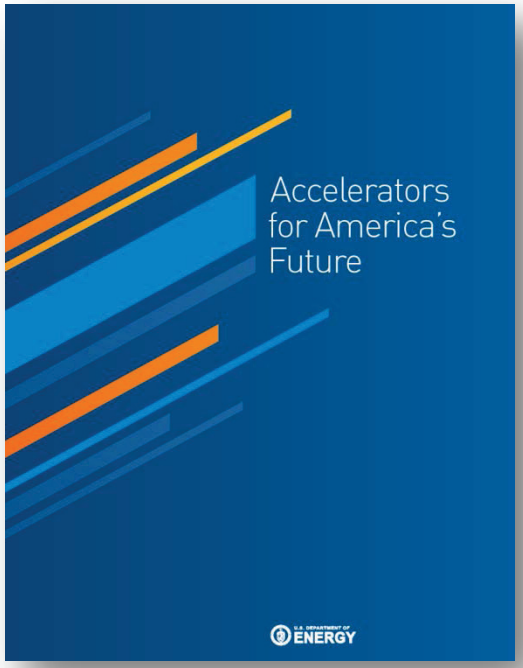
Areas of R&D identified by each working group. All areas are of importance to each working group. Color coding indicates areas with greatest impact.

R&D Need	Energy & Environment	Medicine	Industry	Security & Defense	Discovery Science
Reliability					
Beam Power/RF					
Beam Transport and Control					
Efficiency					
Gradient (SRF and other)					
Reduced Production Costs					
Simulation					
Lasers					
Size					
Superconducting Magnets					
Targetry					
Particle Sources					

Color code: increased priority

http://science.energy.gov/~/media/hep/pdf/accelerator-rd-stewardship/Report.pdf

2011: Senate Requests 10-Year Plan for Accelerator R&D Stewardship



Accelerators for America's Future
Workshop: October 2009
Report: June 2010

http://science.energy.gov/~/media/hep/pdf/accelerator-rd-stewardship/Report.pdf

"The Committee directs the Department to submit a …

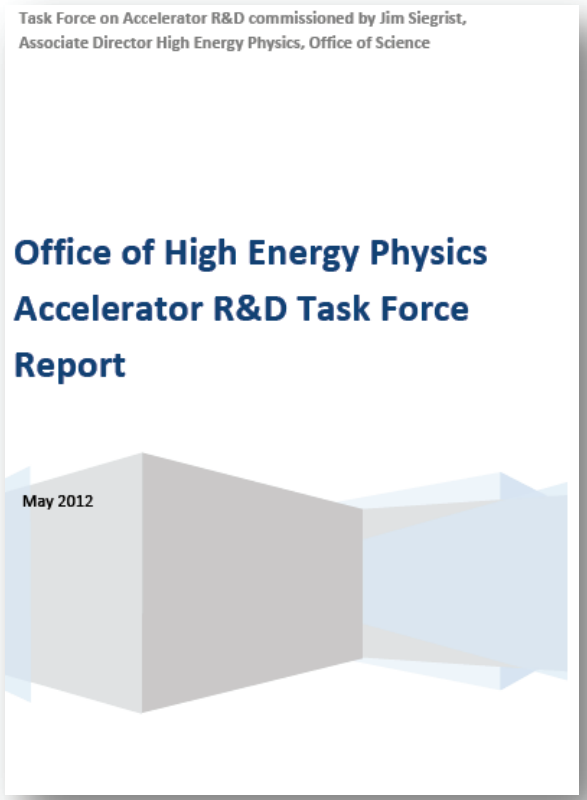
10-year strategic plan … for accelerator technology research and development to advance accelerator applications in energy and the environment, medicine, industry, national security, and discovery science.

The strategic plan should be based on the results of the Department's 2010 workshop study, Accelerators for America's Future, …"

Senate Report 112-075, p. 93. (Ordered to be printed September 7, 2011)

2012: Accelerator R&D Community Task Force Report

The follow-on to *Accelerators for America's Future*



Accelerator R&D Task Force Report
May 2012

http://science.energy.gov/~/media/hep/pdf/accelerator-rd-stewardship/Accelerator_Task_Force_Report.pdf

To prepare for creating an accelerator R&D stewardship strategic plan, Dr. Jim Siegrist, Associate Director of Science for High Energy Physics, in consultation with other SC Associate Directors, asked Dr. Norbert Holtkamp from SLAC to convene and chair a community task force to provide information to:

1. **Identify research opportunities** that might have strong potential for broad national benefits
2. **Summarize the status** of key research and technology areas identified
3. **Identify possible impediments** (both technical and otherwise) to successful accelerator R&D stewardship activities for the broad user base envisioned

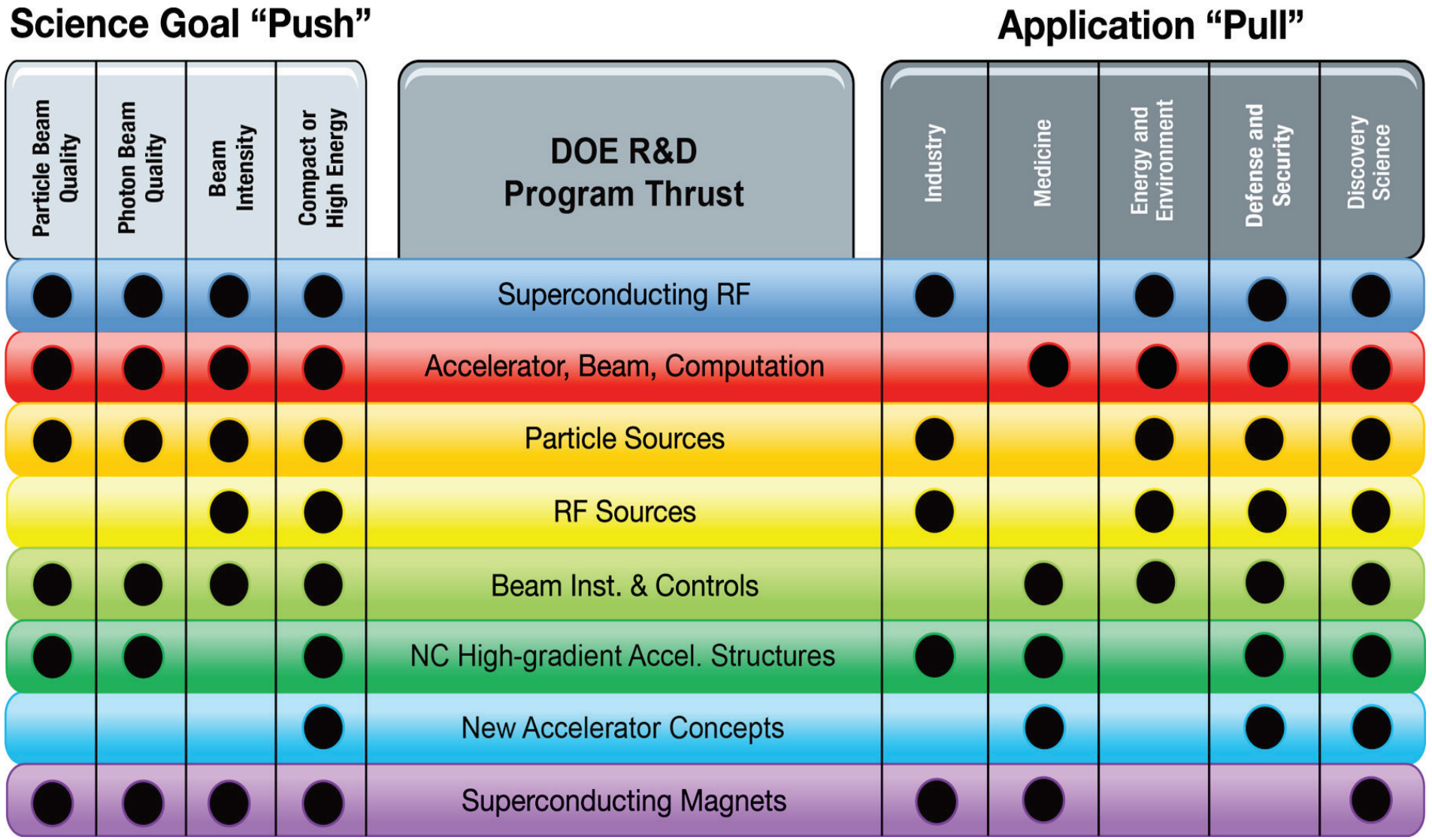
How Does Accelerator R&D Stewardship Fit in HEP?

- **Accelerator R&D develops basic science and technologies needed to design, build, and operate state-of-the-art accelerators**
  - accelerators are essential for making new discoveries in HEP
  - **and** for serving a broader community
    - discovery science
    - industry
    - medicine
    - defense and security
    - energy and environment

⇒ Stewardship

- **There is already a strong connection between current R&D thrusts and stewardship program needs**

Connecting Accelerator R&D to Science and to End-User Needs



2012: Mission of Accelerator Stewardship

- **Mission: to support fundamental accelerator science and technology development of relevance to many fields and to disseminate accelerator knowledge and training to the broad community of accelerator users and providers.**
- **Carrying out this new mission (*in addition to carrying out the present HEP programmatic R&D effort*) will be accomplished through:**
  - **Facilitating access to** national laboratory accelerator **facilities** and infrastructure for **both industrial and other U.S. government agency users/developers** of accelerators and related technology
  - Working with accelerator user communities and industrial accelerator providers to **develop innovative solutions to critical problems**, to the benefit of **both the broader user communities and the DOE discovery science community**
  - Serving as a catalyst **to broaden and strengthen the community** that relies on accelerators and accelerator technology
- **Strategic Plan sent to Congress October 2012**

Programmatic Elements of Stewardship

- Immediately augment existing programs to provide opportunities for industrial and other federally funded users at DOE facilities by increasing support staff and funding for test facilities.
  - 2012: Completed survey of available national lab infrastructure and capabilities
  - 2014: Meeting on Accelerator R&D Stewardship Activities at test facilities
- In the mid-term (2–5 years), identify a few topical areas with high impact for focused work. Anticipated areas are: (1) improved particle beam delivery and control for cancer therapy facilities; and (2) laser development addressing the needs of the accelerator community, i.e., high peak power, high average power, and high electrical efficiency; and (3) energy and environmental applications of accelerators. Each topical area will have a stakeholder board.
- In the longer term (5–10 years), select additional topical areas for focused work. New stakeholder boards will be created as topics are identified.
- In steady state, SC/HEP goal is to support at least three topical areas at any given time.

Initial Topical Area Workshops

- **Workshops organized to assess needs in two identified target areas**
  - Ion Beam Therapy Workshop (co-sponsored by NIH/NCI)
    - January 9-11, 2013 in Bethesda, MD
      - organized by DOE
  - Laser Technology for Accelerators Workshop
    - January 23-25, 2013 in Napa, CA
      - organized by LBNL
  - Both meetings were small and tightly focused
    - attendance by invitation only; included stakeholder agencies
      - limited number of industrial "observers" accommodated
- **Workshop on the 3rd potential topic area, energy and environmental applications, under consideration**

Five Criteria for "Good" Accelerator R&D Stewardship Activities

- **The application must involve accelerators or accelerator-related technologies having synergy with and benefitting the primary HEP mission**
- **There must be non-trivial intellectual involvement of the institution**
  - *Good*: Build an accelerator technology component (usually WFO)
  - *Better*: Design an accelerator technology component (possibly WFO)
  - *Best*: Design, build, and test an accelerator technology component (Stewardship)
- **The activity must be reasonably consistent with the mission of the institution, and minimally impact the primary SC program**
  - *Good*: Activity **maintains**
  - *Better*: Activity **expands**
  - *Best*: Activity **develops new**

  } **core skill or facility needed for the mission**
- **The institution must arguably be the best provider* of the capability or service**
  - *Good*: Institution's capability is not unique, but institution is close to customer
  - *Better*: Institution's capability is leading, and institution is close to customer
  - *Best*: Institution is the only possible provider
- **The customer benefiting from the stewardship activity must endorse the goals**
  - *Good*: Customer participates in discussion of task definition, writes letter of support
  - *Better*: Customer and institution partner, some cost sharing from customer (e.g. 1:10)
  - *Best*: Customer and institution partner, significant cost sharing from customer (e.g. 1:1)

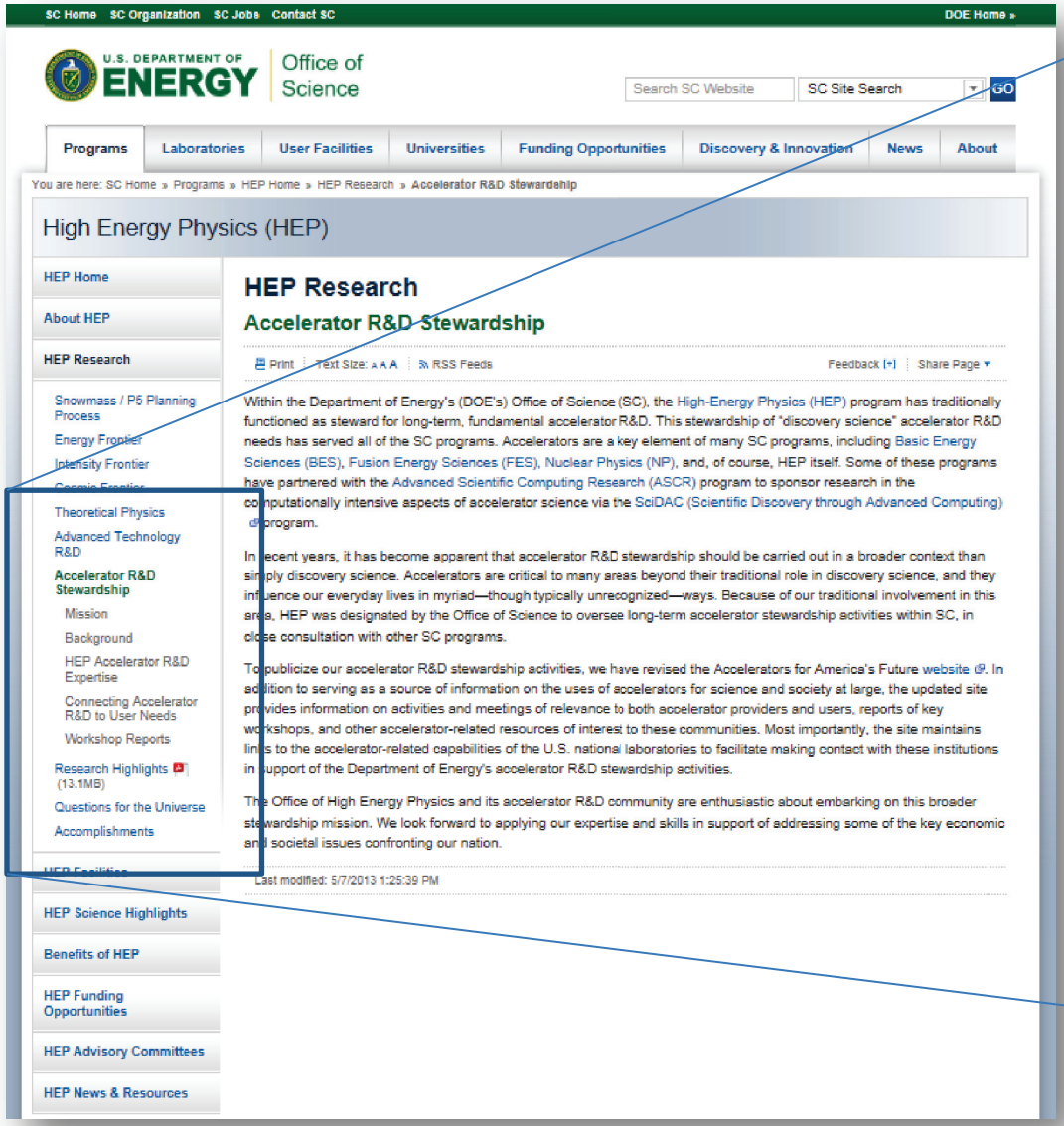
*and must not compete with an existing business

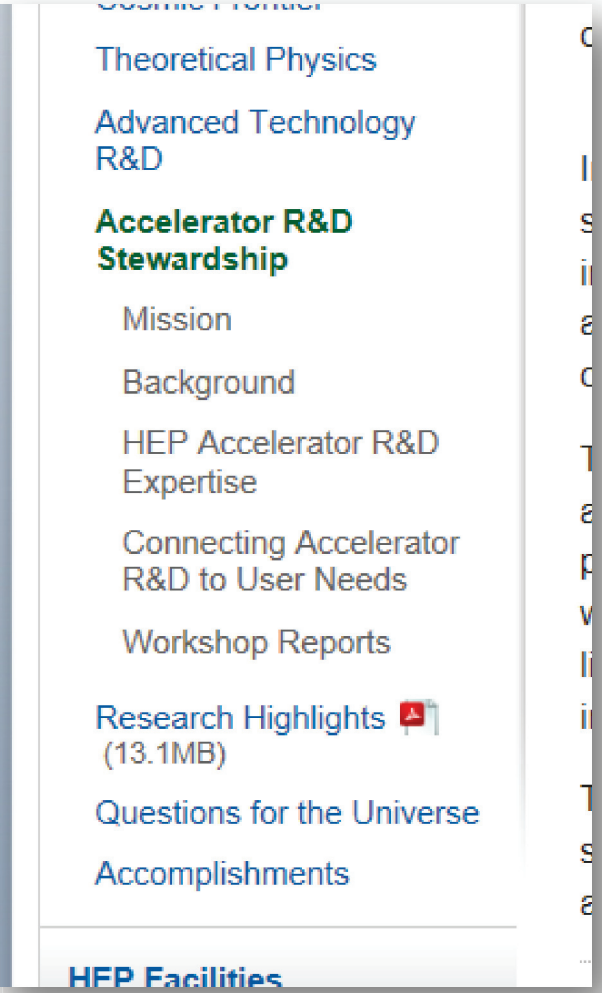
How can you engage?

- **Read the Stewardship program description and workshop reports at**
  - http://science.energy.gov/hep/research/accelerator-rd-stewardship/
- **Respond to Test Facilities Pilot Program call (*Labs only*)**
  - Identify potential lab test facility customers and understand their needs
  - Wait for meeting charge to come
- **Topical Area calls**
  - Start gathering ideas, think about your collaborative teams
  - Be aware of related calls
    - The NIH P20 call for a National Center for Particle Beam Radiation Therapy Research http://grants.nih.gov/grants/guide/pa-files/PAR-13-096.html
    - DOE SBIR/STTR new topic area for laser technology
- **Propose new, challenging topical areas**
  - Must result in a "solution" that is broadly useful within a <10 year timeframe
  - There must be market-pull for the "solution"—know your "customer"!

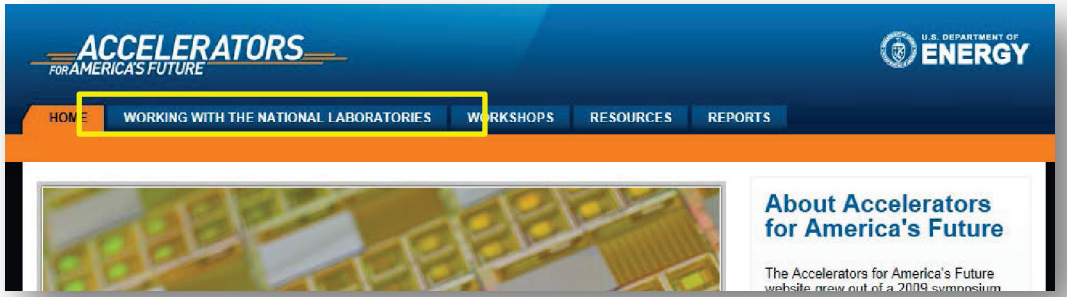
Caveat: isotope R&D is supported **exclusively by NP**.
NP issues its own biennial FOA for this topic, to which relevant proposals should be directed.

HEP Accelerator R&D Stewardship Web Site





Accelerators for America's Future Web Site



The nation's portal for new users to browse lab capabilities and identify a contact person for more information.

Take-Home Messages

- **Eligibility for stewardship program will be broad**
  - **it is *not* a Lab entitlement program**
- **"Customer" must actively desire and participate in activity**
  - **pure "technology push" is not sufficient**
- **Activities should accrue some measureable intellectual benefit to HEP**
- **Stewardship topical areas should address high-impact challenges on ~5-10 year timescale**
  - **goal is to solve problems and move on, not create additional long-term R&D thrusts**
- **Handling IP remains a challenge**
  - **WFO provides precedent**
    - **probably need to deal with this case-by-case**