

? Accelerator R&D - a New Era?

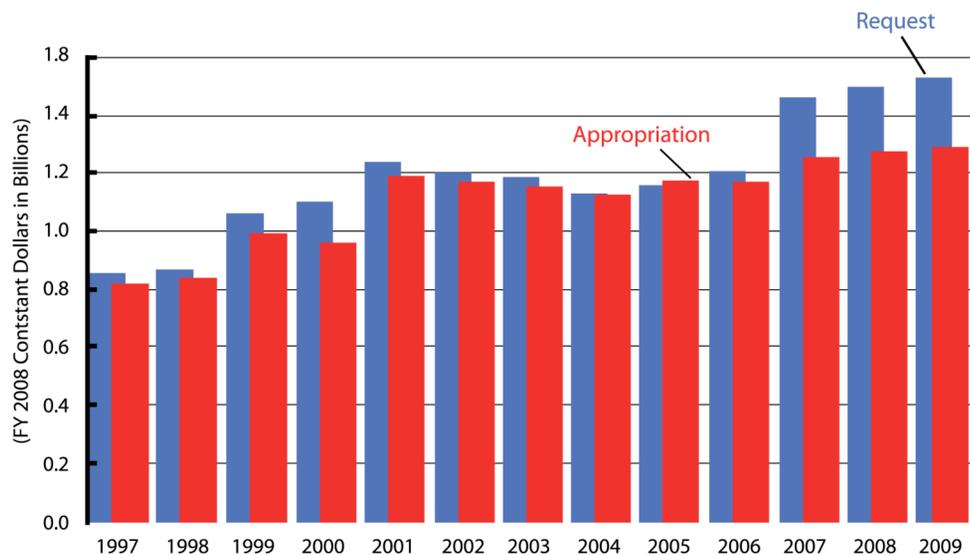
Lake Geneva

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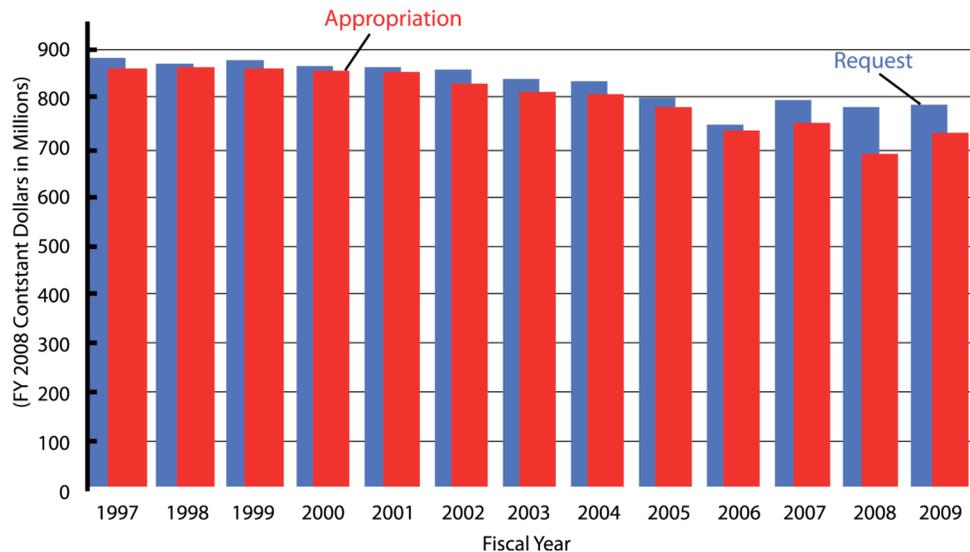
The story is simply told.

Look at this:

BES



HEP



and this

KEEPING AMERICAN ACCELERATOR R&D HEALTHY WHILE FOCUSED ON BROADER NEEDS WILL TAKE SOME DOING:

- The lion's share of innovation in accelerator R&D, support of the underlying "generic" accelerator R&D and education of accelerator science and technology personnel has been done in the HEP and NUC labs. The resources for doing this have been drastically cut!

- DOE AND NSF are aware of the changed situation (AAAS Feb. Annual meeting (et seq.) for statements by Pat Dehmer and Tony Chan)
 - there will be a series of invitational workshops to deal with the high level requirements of the major stakeholders followed by detailed looks at what's required to meet those needs
 - at the DOE, stewardship will remain with HEP; NSF situation not yet settled but PHY still involved in some ARD of various kinds
- We can be optimistic but we will have to work hard to make optimism reality; e.g.
- Missionary work with our neighbors and with CONGRESS will be needed

- On the *COMMUNITY* (that's us) side we need to help prepare the case that accelerator R&D is important to the nation and worthy of investment
 - Economic analysis underway shepherded by FNAL
 - We all need to be active in addressing the importance of *ARD* to our neighbors and elected representatives **AND** our colleague users of accelerators for the materials sciences (bio, med. Research, phys sci...)
- At a minimum, we each need to be prepared to discuss why "*Generic Accelerator R&D*" - which is pretty much what we're talking about here at Lake Geneva - is important for eventual applications which can't be predicted in advance except in a very general way

- The themes can be:
 - what accelerators are used for now
 - better performance per capital \$
 - better performance per operating \$
 - capabilities not heretofore possible
 - opening up new applications for health and economy
 - you think of it.....
- Book project now underway to detail relevant examples of today that illustrate these points - read and memorize

Industrial accelerators and their applications

Robert W. & Marianne E. Hamm, editors.

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for this same purpose I can recommend two presentations from the most recent ICFA Seminar: go to

<http://www-conf.slac.stanford.edu/icfa2008/>

select "agenda" and look for Hartmut Eikhoff and Bob Hamm - Oct 30 session - Medicine & Industry respectively

WHAT IS "GENERIC ACCELERATOR R&D"

- we are used to speaking of AARD as something that's out there in front with no immediate application but of pure scientific interest or potential for some application or other in the somewhat distant future
 - e.g. laser, wakefield, plasma based accelerators, ultra bright sources, wakes at time durations with surface plasmon frequencies..... etc

- Owing to current circumstances may I offer a broader definition of Generic Accelerator R&D to include, in addition to the AARD items mentioned above, those things that have suffered "collateral damage" in the recent budget realignments - things that we formerly took for granted but which are now no longer supported or supported at a dangerously attenuated level i.e. the foundations of all accelerator science and technology:

Many sub-categories in most boxes

Power sources (rf and laser)	Magnets SC
Materials (optical, sc, low sey.)	Cooling (stoch., e-, ioniz'n)
ϵ exchange + other lattices	Plasma devices
Sources (e+-, ions, p, pbar..)	Instrumentation
HOM damping	Short bunch wakes
High power tgts	Instrumentation
Space charge effects	Ion effects
e-cloud	RF & laser structures
Structure processing	Materials analysis
Ultra high vacuum	Ultra high gradients
Theory	Simulation & computation
.....	etc.

OR - slicing it another way - we're always after beams with:

Higher intensity

Higher brightness (6D)

Shorter pulses

Higher efficiency

&

Instrumentation to measure the new characteristics

TAKE HOME MESSAGE

- WE MAY HAVE A RARE and GRAND OPPORTUNITY TO ENHANCE THE SUPPORT FOR ACCELERATOR SCIENCE
- TO SEIZE THIS OPP WE'LL NEED TO COMMUNICATE OUR IMPORTANCE TO GOVERNMENT AND PUBLIC
- OUR MOST PRESSING OBLIGATION IS FIRST CLASS ACCELERATOR SCIENCE - THAT'S WHY WE'RE HERE