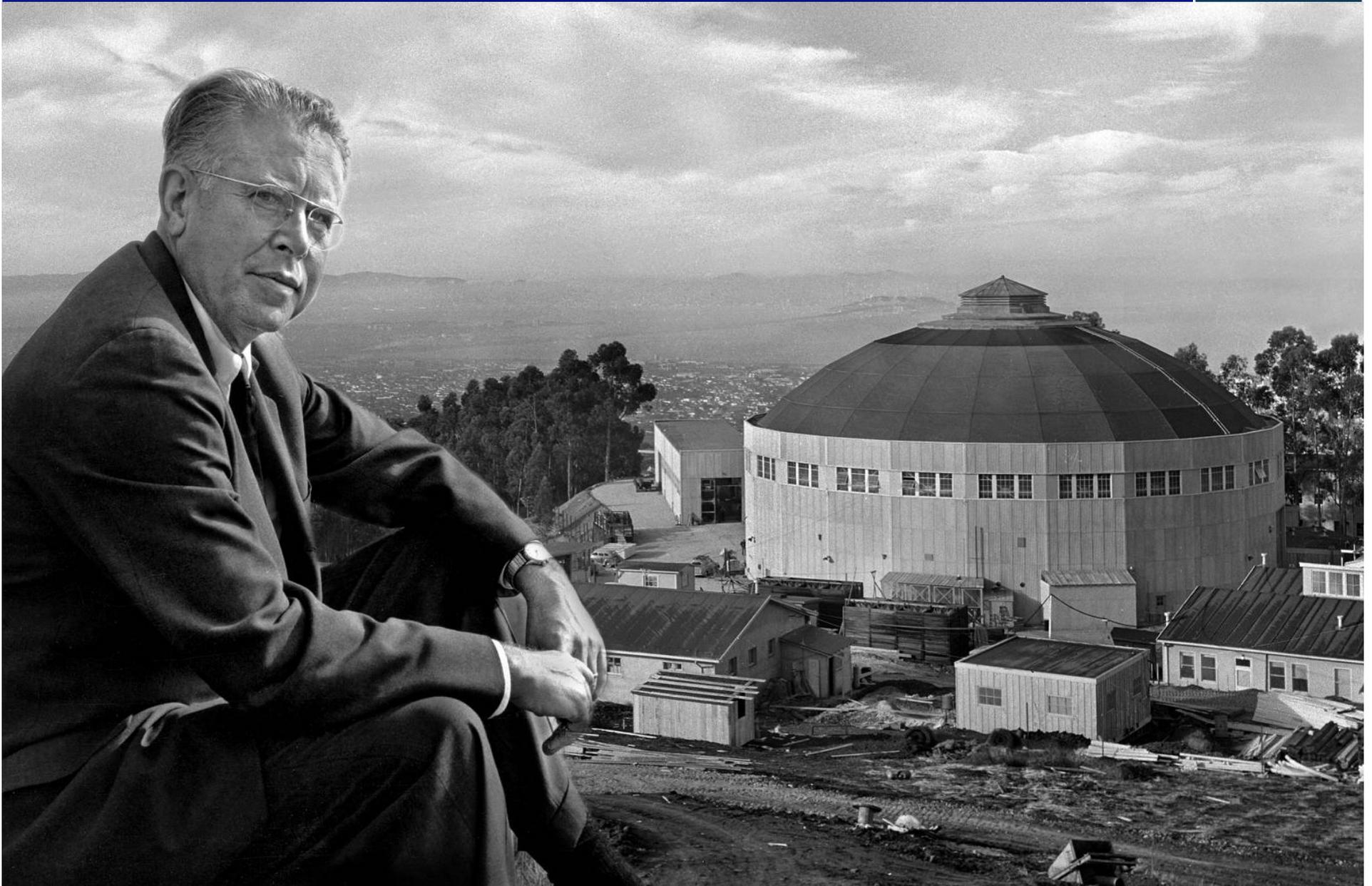


# *HEP Community Planning Process: The View from Berkeley Lab*

*Natalie Roe, LBNL Physics Division Director,  
on behalf of Paul Alivisatos, LBNL Director  
October 11, 2012*



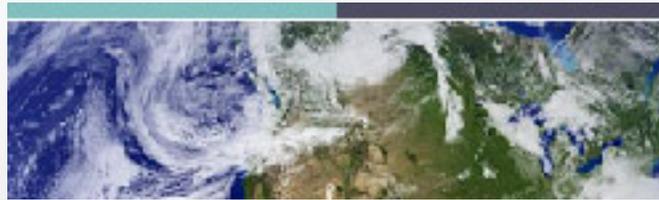
# LBNL: On the Energy Frontier



# Berkeley Lab Strategic Directions



**Photon Science:  
X-Rays for Discovery**



**Climate Change and  
Environmental Sciences**



**Energy Efficiency and  
Renewable Energy**



**Computational Science  
And Networking**



**Biological Sciences for  
Energy Research**

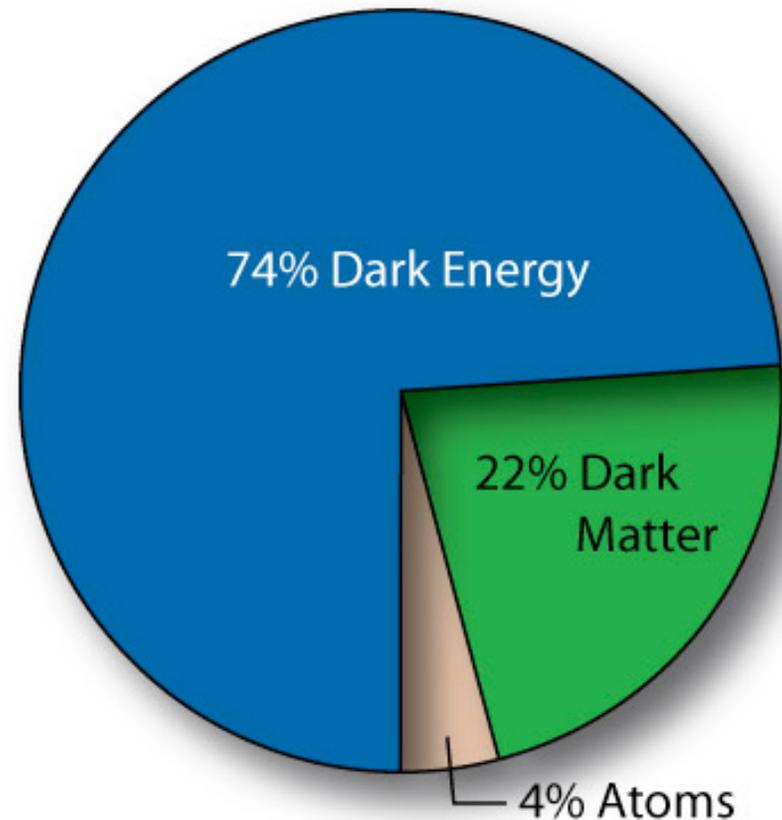


**Matter and Force  
In the Universe**

# LBNL Physics Division Program



- Energy Frontier:
  - Origin of Mass
  - New Physics
- Cosmic Frontier:
  - Dark Energy (SNe, BAO)
  - Dark Matter
  - CMB: inflation,  $\nu$  masses
- Intensity Frontier:
  - Neutrino properties
  - BSM physics in rare decays
- Theory
- Particle Data Group
- Detector R&D
- Accelerator & Fusion Research (AFRD)

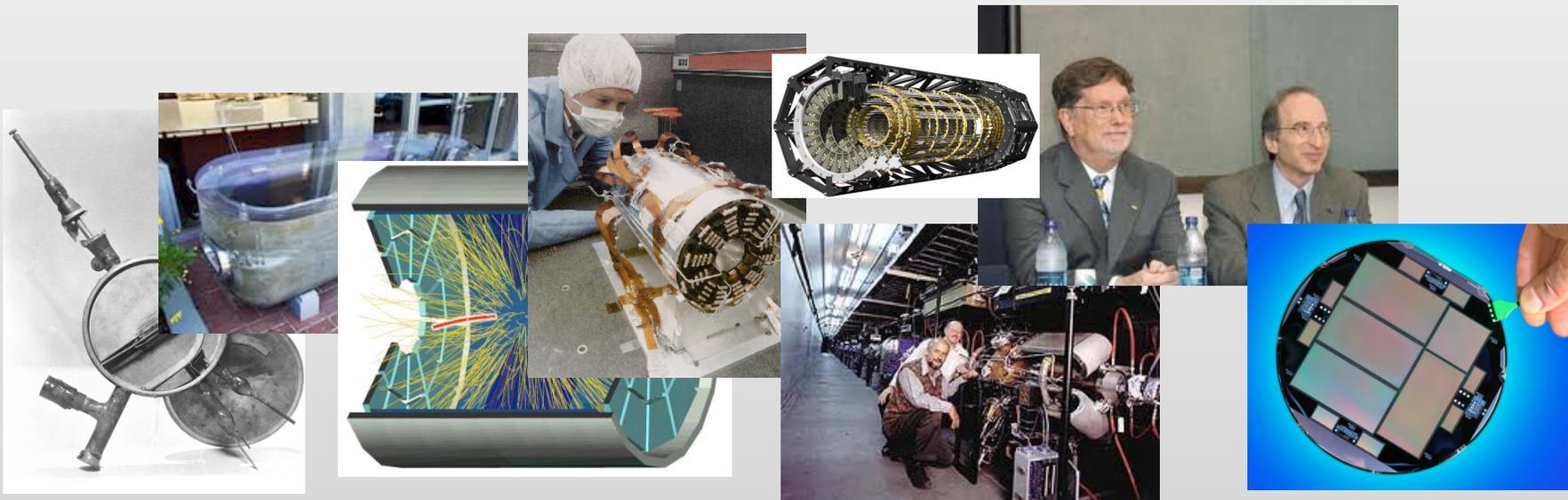


**LBNL ~4% of HEP budget**

# Tradition of Innovation

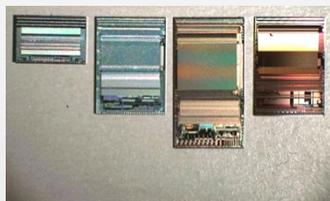


- Long tradition of innovation at LBNL beginning with Lawrence, Alvarez
- Responsible for many “game-changers”: TPC detector, silicon vertex detectors and readout, asymmetric B Factory, pixel detectors, COBE, Type Ia SNe, red-sensitive CCDs,.....



# Innovations Enable Collaborations

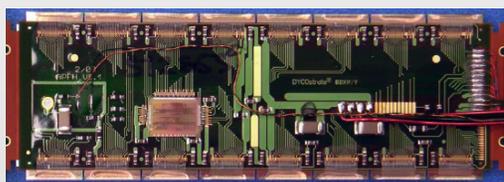
## IC Design/Electronics



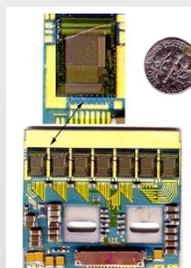
**SVX:CDF/D0**



**ATWR:  
IceCube/  
KamLAND/  
Daya Bay**

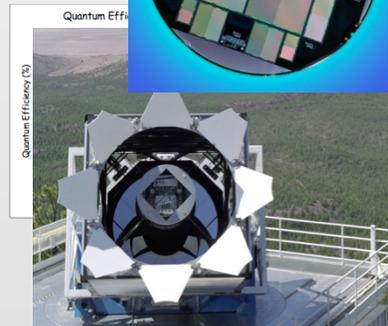
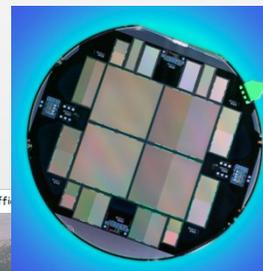


**Pixel module: ATLAS**



**AToM:BaBar**

## MicroSystems Lab



**DES, BOSS, BigBOSS, LSST**

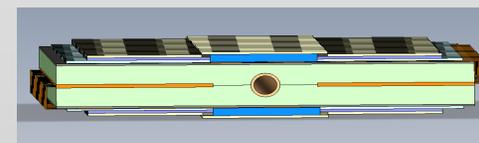
## Carbon Fiber Composites



**SVT:BaBar**  
BaBar team - LBNL  
#9502-00245-07

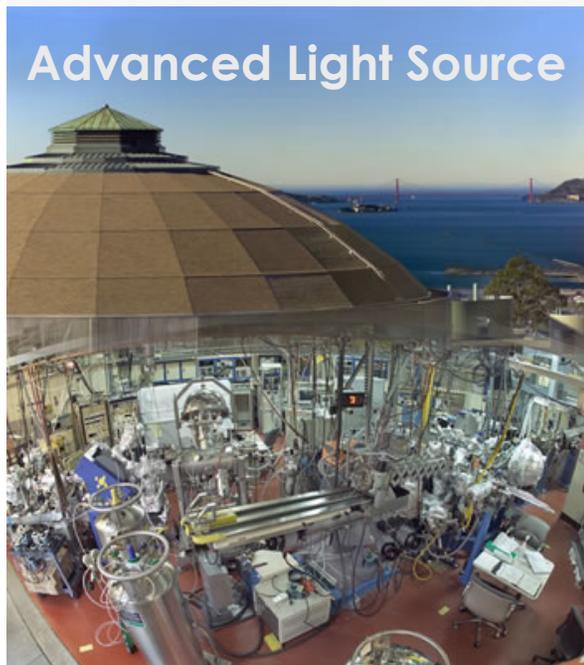


**Pixel detector: ATLAS**



**ATLAS Upgrade  
Silicon Stave**

# Advanced User Facilities at LBNL



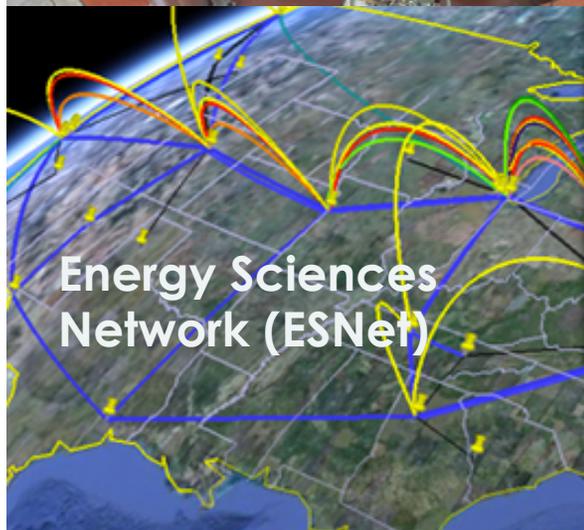
Advanced Light Source



MicroSystems Laboratory



Molecular Foundry



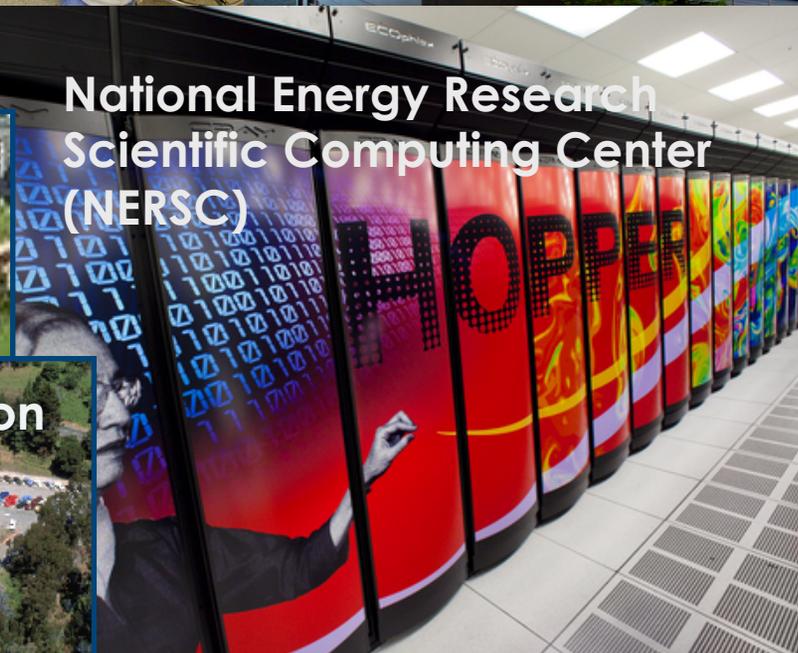
Energy Sciences Network (ESNet)



National Center for Electron Microscopy (NCEM)



88" Cyclotron



National Energy Research Scientific Computing Center (NERSC)

# LBNL Resources for HEP

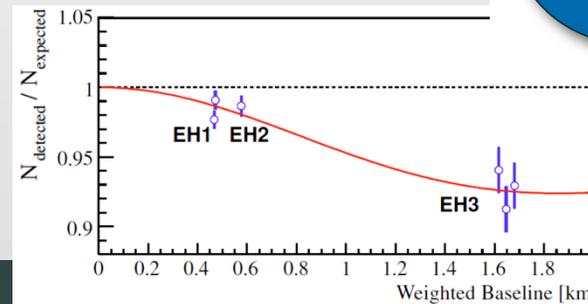
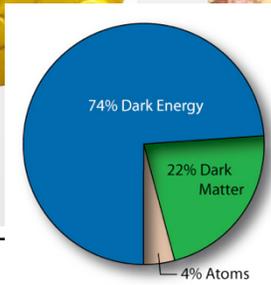
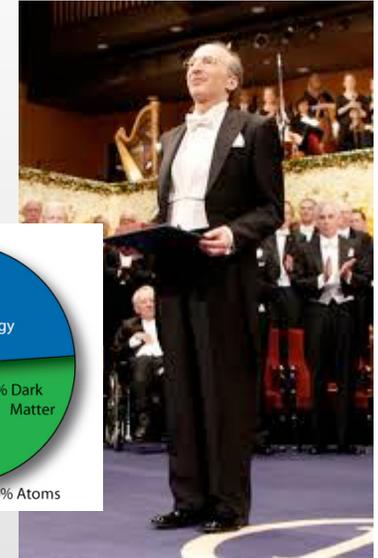


- Computing:
  - NERSC
  - ESNNet
  - Computing Research Division expertise
- Engineering
  - Mechanical and Electrical Design
  - Integrated Circuit design
  - Composite materials facility
  - MicroSystems Lab
  - Project Management
- Accelerator Science
  - Superconducting Magnet technology
  - Laser-driven plasma wakefield acceleration
- Nanotechnology
  - Molecular Foundry
  - National Center for Electron Microscopy

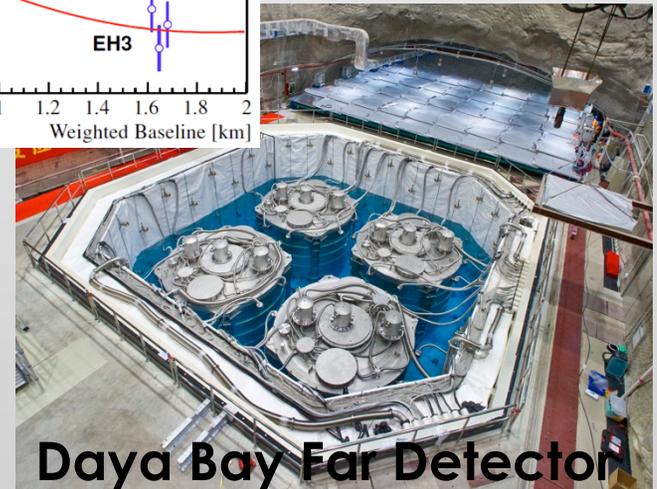
# An Exciting Year at the Frontiers...



- October 2011: Nobel Prize for the discovery of dark energy
- March 2012: First results from Daya Bay: Large  $\sin^2 2\theta_{13}$
- July 2012: Higgs-like boson!



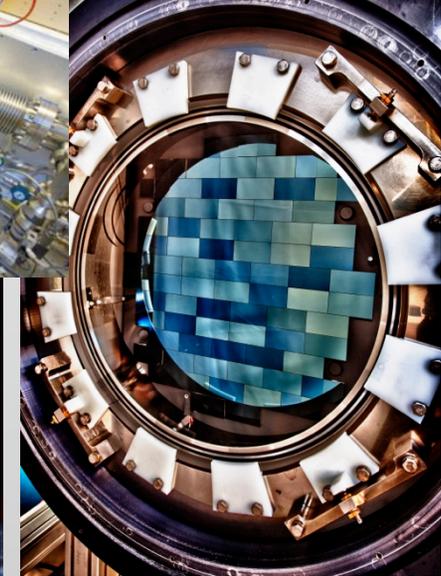
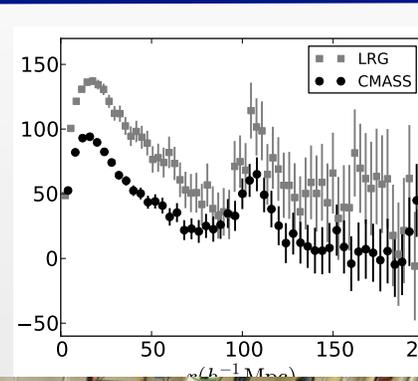
Higgs Panel at Berkeley



Daya Bay Far Detector

# More Excitement to Come ...

- April 2012: First BAO results from BOSS
- July 2012: BELLA achieves 1PW pulse
- September 2012: DECam first light
- September 2012: LUX installed at 4850ft in Homestake



# Looking Ahead

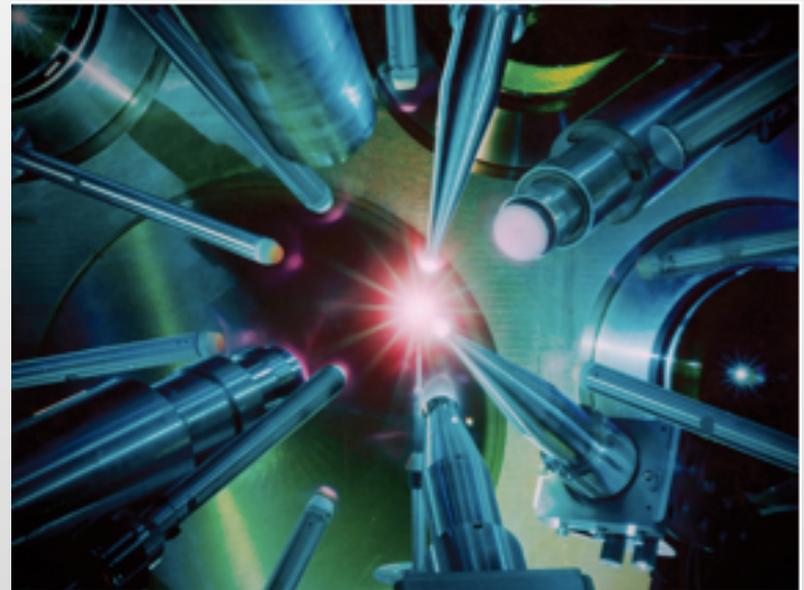


- HEP is vital and exciting
- On the verge of answering important questions on all 3 frontiers
- But we face challenges
  - flat funding
  - need for a leading domestic facility
  - credibility gap in large international projects
  - ***need a realistic plan for our future...***

# Snowmass 2013



- Articulate compelling physics opportunities on all frontiers
  - Lead with physics
  - Accept budget realities
  - Provide ideas and input for roadmap of the future
  - Circle the wagons
  - But don't shoot inwards!



# Parting Thoughts



- Snowmass => thousand flowers will bloom
- P5 => set the roadmap for next decade
- Proposal: start P5 process in parallel
  - Focus the work and strengthen the Snowmass process by providing direct input to P5
  - Minimize the delay between Snowmass and the roadmapping process
  - Provide timely input to international planning efforts which are already well underway