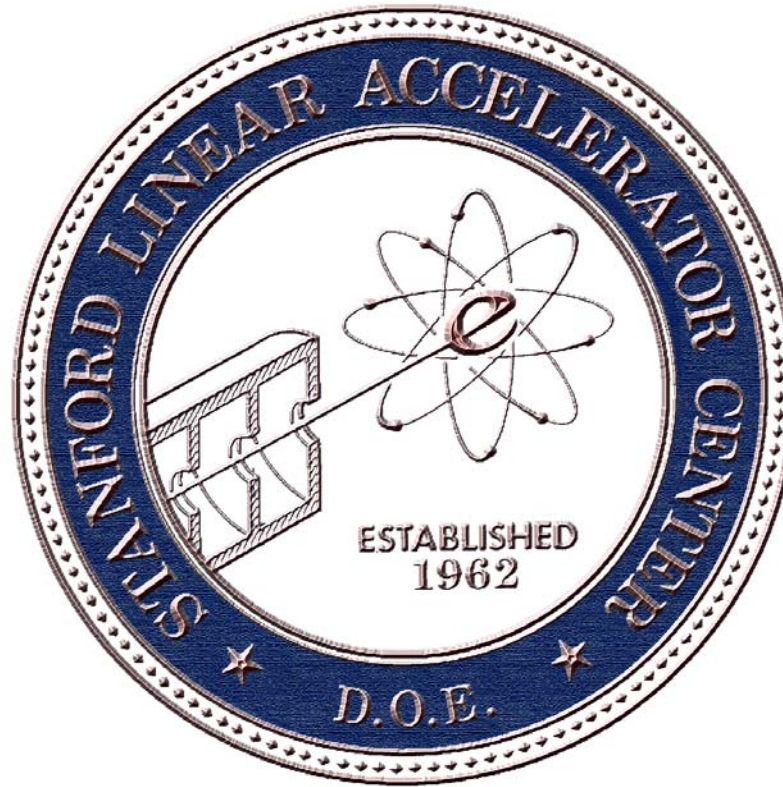


# Overview of SLAC



By Persis Drell

**GLAST IFC**

February 18, 2003

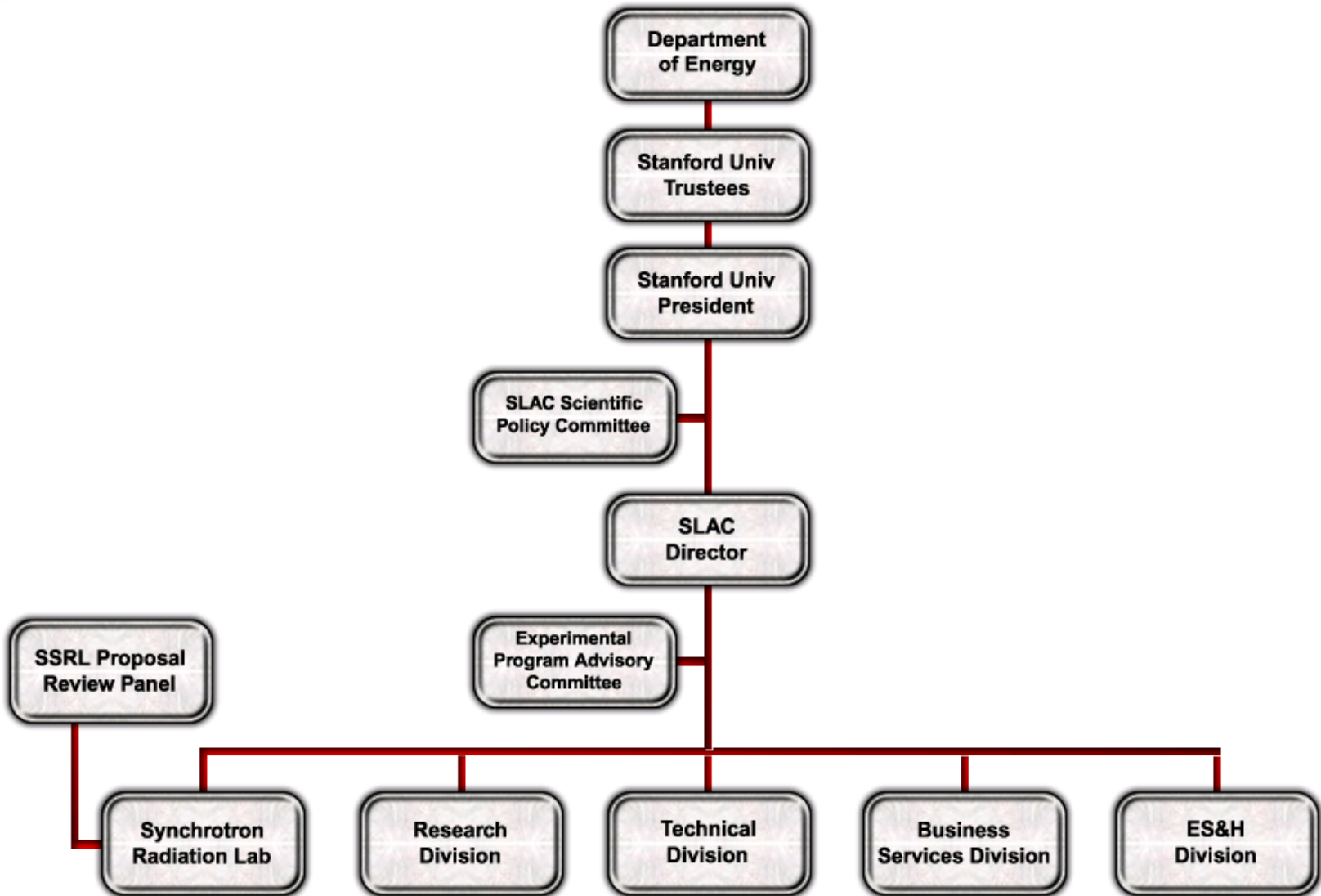


# SLAC-History

- **A government-owned facility operated by Stanford and located on about 430 acres of Stanford land leased to the federal government**
- **Created by the Stanford faculty of the late 1950's as a continuation of research that began pre-World War II**
- **SLAC was approved by the Stanford Trustees in 1962. Construction started in 1963 and the first experiments began in 1967**
- **SLAC's open to all scientists worldwide on the basis of proposals submitted for peer review. Laboratory conducts fundamental research, unclassified in nature, and widely published in the open literature**
- **The laboratory has remained on the frontiers of science through continued upgrades and additions to its initial complement of accelerator facilities**



# SLAC is managed as an M&O Contract between Stanford University and DOE





# Two Main Programs

---

- **High Energy Physics / Particle Astrophysics**

**Experiments, theory, accelerator development for studies of the ultimate structure of matter, the forces between the fundamental entities, the birth and evolution of the universe**

- **Synchrotron Light Source**

**The use of ultra high-intensity x-ray beams (ten million times the intensity of x-ray tubes) for studies in physics, biology, chemistry, medicine, and environmental sciences**



# SLAC as an Academic Institution

- **SLAC is a School of Stanford University**

- ↖ **SLAC Director acts as the Dean of the School and serves on the President's Cabinet**

- **School has two faculties:**

- High Energy Physics ~ 28 active Professors**

- ↖ **Three have won Nobel Prizes for work done at SLAC**

- Stanford Synchrotron Radiation Laboratory ~ 17 active Professors**

- ↖ **Most of the SSRL faculty have joint appointments with other departments on campus**

- **SLAC faculty are prominent in the education of students and postdoctoral fellows**

- **The key to SLAC's success has been its intimate connection to a great research university**



# SLAC as an International Research Facility

- **3000 scientists from ~ 25 nations do their research at SLAC**

**Our primary function is operating large research facilities for our users. This requires**

- Highly specialized technical staff and extensive infrastructure to design, construct and maintain large accelerators and detectors**
  - Extremely efficient operation of complex accelerators and detectors**
  - Highly specialized, state of the art, computing systems (running 24/7/12) for the analysis and worldwide distribution of data**
- **Science program at SLAC generates 800-900 publications per year**





# Stanford Linear Accelerator Center (FY2002)

**High Energy  
Physics**

~ \$160

**1135**

**1273**

**Synchrotron  
Light Source**

~ \$30M

**225**

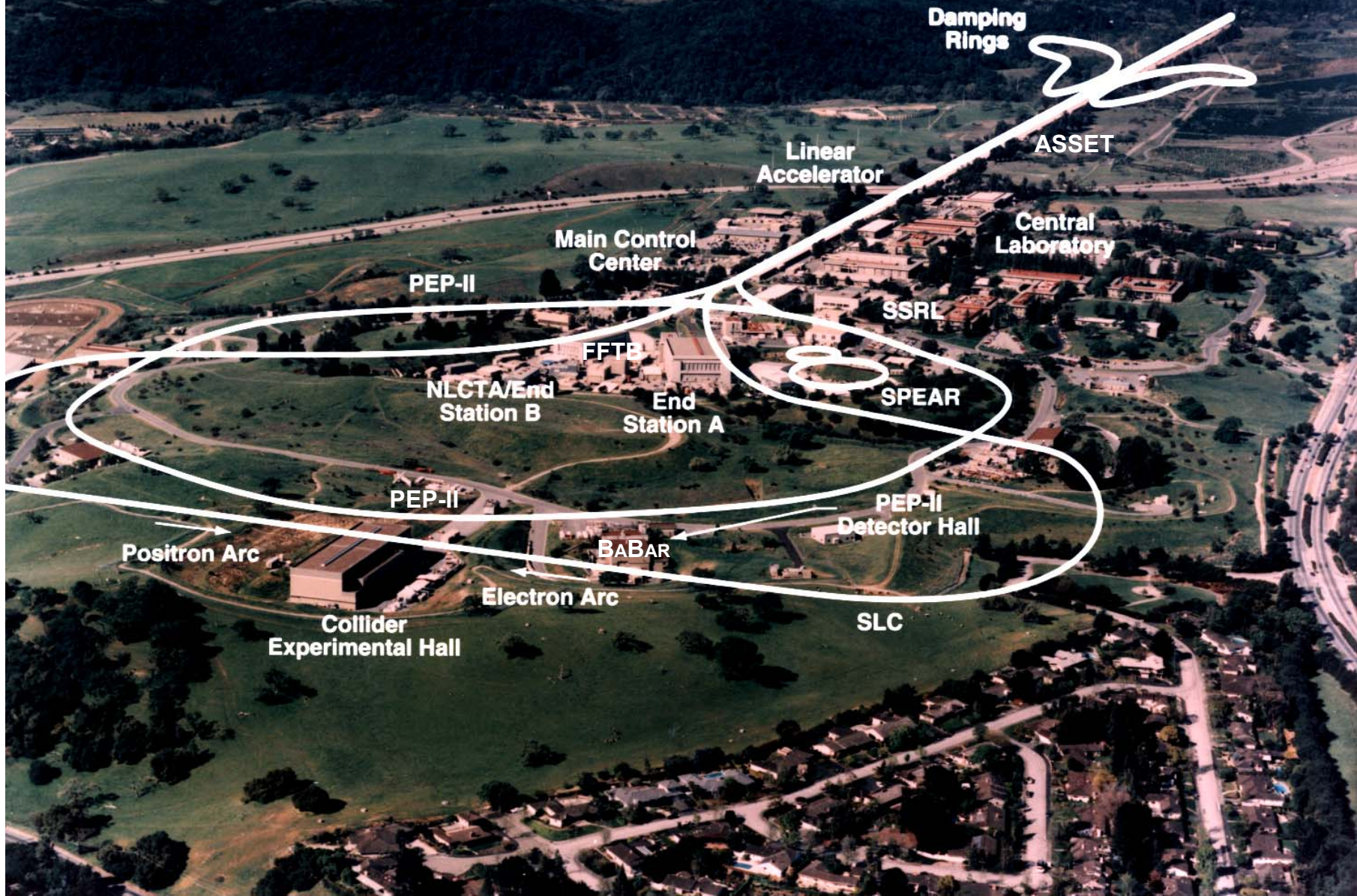
**1711**

**Staff (FTE)**

About half of the laboratory  
staff are degreed professionals

**Scientific Users**

# Stanford Linear Accelerator Center





# SLAC HEP Program

## ○ Main elements of the SLAC HEP Program

↖ ***B* Factory – PEP-II (machine), BABAR (detector)**

↖ **Particle Astrophysics and Cosmology**

↖ **Linear Collider**

↖ **In addition:**

④ **End Station A fixed Target Program**

④ **Non Accelerator-Based Particle Physics**

— Quark Search

— EX0 – R&D study for expt. to measure  $\nu_e$  mass

④ **Theory**

④ **Accelerator R&D**

— Diverse, user-based program of advanced accelerator R&D experiments and theory

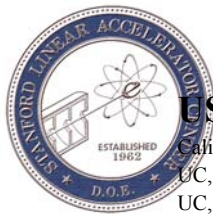
④ **Test Beams**

— Used by the worldwide community to benchmark evolving detector technologies and to calibrate detector sub-units



# ***B* Factory**

- **A major success story for SLAC and the DOE Office of Science**
  - ↪ **On-time, on-budget; example of SLAC & DOE's ability to manage a \$300M multi-lab, multi-nation project**
  - ↪ **All design parameters exceeded – within two years of first collisions**
  - ↪ **Science has emerged rapidly**



## USA

California Institute of Technology

- UC, Irvine
- UC, Los Angeles
- UC, Riverside
- UC, San Diego
- UC, Santa Barbara
- UC, Santa Cruz
- U of Cincinnati
- U of Colorado
- Colorado State
- Florida A&M
- Harvard
- U of Iowa
- Iowa State U
- LBL
- LLNL
- U of Louisville
- U of Maryland
- U of Massachusetts, Amherst
- MIT
- U of Mississippi
- Mount Holyoke College
- SUNY, Albany
- U of Notre Dame
- Ohio State U
- U of Oregon
- U of Pennsylvania
- Prairie View A&M U
- Princeton U
- SLAC
- U of South Carolina
- Stanford U
- U of Tennessee
- U of Texas at Albany
- U of Texas at Dallas
- Vanderbilt
- U of Wisconsin
- Yale

# The *BABAR* Collaboration

9 Countries  
74 Institutions  
566 Physicists

## Canada

- U of British Columbia
- McGill U
- U de Montréal
- U of Victoria

## China

- Inst. of High Energy Physics, Beijing

## France

- LAPP, Annecy
- LAL Orsay
- LPNHE des Universités Paris VI et VII
- Ecole Polytechnique, Laboratoire Leprince-Ringuet
- CEA, DAPNIA, CE-Saclay

## Germany

- Ruhr U Bochum
- Technische U Dresden
- U Rostock

## Italy

- INFN, Bari
- INFN, Ferrara
- Lab. Nazionali di Frascati dell' INFN
- INFN, Genova
- INFN, Milano
- INFN, Napoli
- INFN, Padova
- INFN, Pisa
- INFN, Roma and U "La Sapienza"
- INFN, Torino
- INFN, Trieste

## Norway

- U of Bergen

## Russia

- Budker Institute, Novosibirsk

## United Kingdom

- U of Birmingham
- U of Bristol
- Brunel U
- U of Edinburgh
- U of Liverpool
- Imperial College
- Queen Mary , U of London
- U of London, Royal Holloway
- U of Manchester
- Rutherford Appleton Laboratory

October 8, 2002



# The Linear Collider

- **Exploration of the TeV scale will begin, but not end with the CERN LHC**
- **World-wide consensus (US, Europe, Asia):**
  - ↪ **A high energy, high luminosity  $e^+e^-$  linear collider is the highest priority new project for the field.**
- **SLAC is home to one of the 2 major machine R&D efforts aimed at developing the technology to enable this machine.**
- **SLAC will be a major player in the design, construction, operation, and exploitation of this facility.**



# **Gamma Ray Large Area Space Telescope**

- **Use of HEP detector techniques to probe leading scientific mysteries in Astrophysics and Cosmology**
- **Important international project involving major contributions from France, Italy, Japan, Sweden, and US.**
- **Important interagency initiative – combines the strengths of ASI, CEA, CNES, DOE, IN2P3, INFN, NASA.**
- **GLAST has great discovery potential**



# Other Particle Astrophysics at SLAC

- **Continued analysis of USA data**
  - ↪ **Studies of regions of strong gravity**
  
- **Ongoing projects using archival and guest observer data**
  
- **Experiments in FFTB and ESA**
  - ↪ **FLASH**
  - ↪ **Lab Astro**
  
- **2003 SLAC Summer Institute**

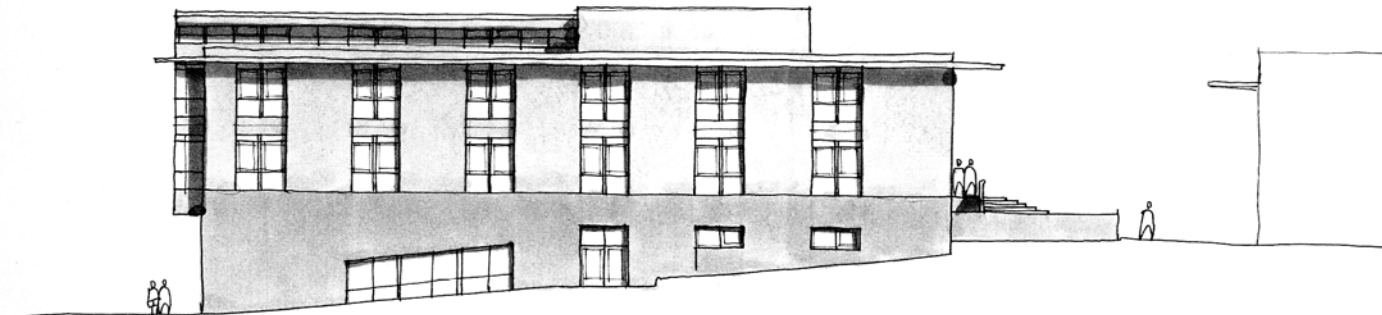


# Institute for Particle Astrophysics and Cosmology

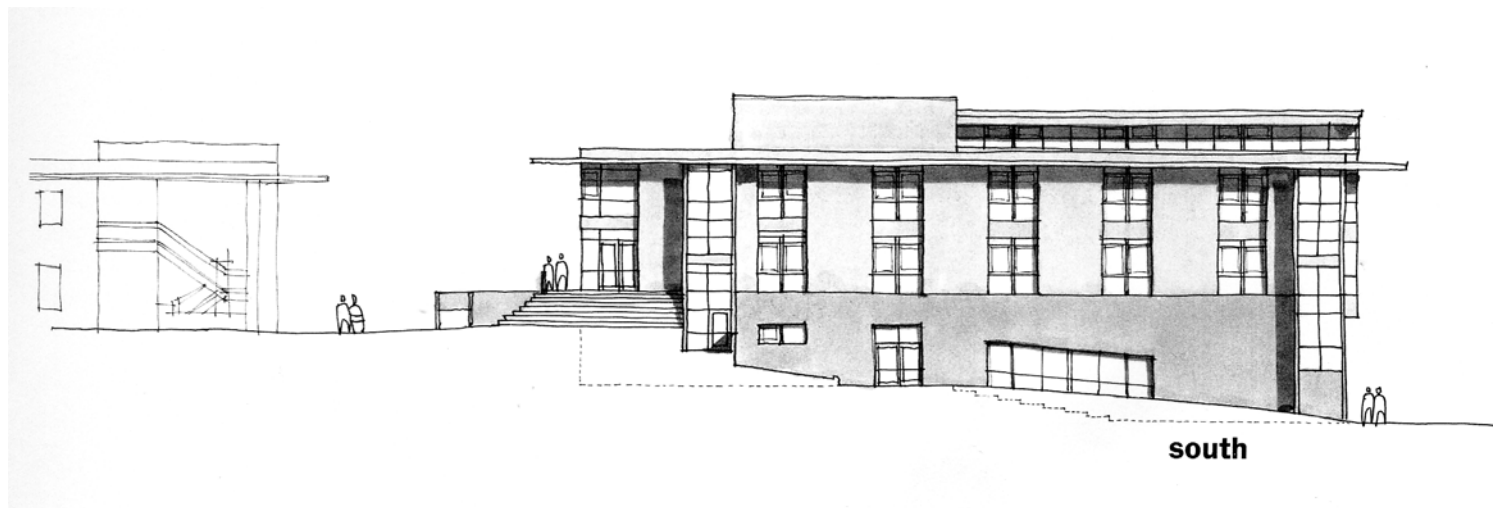
- **Institute building on SLAC site**
- **Director reports to Stanford Dean of Research**
  - ↪ **Operates as independent research center**
  - ↪ **9 faculty lines**
- **Director and Deputy Director have been recruited**
  - ↪ **Roger Blandford (CalTech) will be the first Director**
  - ↪ **Steven Kahn (Columbia) will be the first Deputy Director**
- **Discussions beginning on the scientific directions that the institute will take.**



# Kavli Institute at SLAC



north



south



# GLAST IFC

- ***“The International Finance Committee, chaired by the Associate Director of SLAC for Research, will meet as needed to review the status of commitments of all partners (U.S. and foreign) in the GLAST LAT Project.”***
  
- **By meeting together we create a forum to both share concerns and to help support the GLAST LAT project.**
  - ↪ **In this way we will ensure the project is completed on schedule and within budget.**



# Agenda and Goals for Meeting

- **Overview of LAT Project**
  - ↵ **Collaboration Roles**
  - ↵ **Instrument Design and Technical Status**
  - ↵ **Project funding and schedule**
  
- **Agency Roundtable**
  - ↵ **Roundtable discussion of funding status from each agency**
  
- **CY03 Spending**
  - ↵ **Discussion of CY03 funding**
  - ↵ **Discussion of CY03 deliverables**
  
- **Role of Collaboration during I&T and commissioning**



# Agenda and Goals for Meeting (cont.)

---

- **Discussion with CNES and ASI representatives**
  - ↪ **Dr. Simone Di Pippo (by phone)**
  - ↪ **Dr. Richard Bonneville (by phone)**
  
- **Further discussion of open items**
  
- **Action Items, Goals for next meeting**