Kavli Institute
for
Particle Astrophysics
and
Cosmology
History

• 2000 Joint campus -SLAC study of opportunities in particle astrophysics and cosmology and proposal to establish an Institute
• 2001 Chen Institute announced
• 2002 Director search
• Jan 2003 Kavli gift announced and Blandford and Kahn accept positions
• March 2003 Inauguration
Future Plans

- May 2003 Kahn arrives
- May 2003 Local area meeting
- July/August 2003 Blandford arrives
- Sept 2003 Postdocs/Visitors arrive
- Dec 2003 DOE/NASA/NSF Meeting Washington
- March 2004 Beyond Einstein Meeting Stanford
- Sept 2004 2 new faculty?
- Dec 2004 Texas Symposium
- Sept 2005 2 new faculty?
- Oct 2005 Fred Kavli Building
Feasibility Study for the Particle Astrophysics and Cosmology Center
Rationale

- Particle Astrophysics and Cosmology
  - Interpreted broadly!
- Joining communities
  - Physics and Astronomy
  - Theory and Experiment
    - Equations to electronics (RB+SK)
  - SLAC and Campus
    - Bridge rooted in both communities
  - DOE, NASA and NSF
    - GLAST, SNAP, VERITAS, LSST, EXIST....
  - Forum
    - Auditorium, meetings, Information Center
Staffing

• 2003
  – Blandford KIPAC Director
  – Kahn Assistant Director, Assistant Research Director, SLAC
  – Administrative staff
  – Research Staff: 2-3 experimental, 1 computational
  – Students: 4
  – Visitors: 3 senior, 5 junior
Staffing (cont'd)

• 2004-
  – 2 ass't prof (1 theory, I expt)
  .......... 

• ~2008
  – 9 KIPAC faculty, joint campus-SLAC
  – ~100 KIPAC personnel
  – Campus associates (Byer, Cabrera, Church,
    Michelson, Romani, Petrosian, Wagoner....)?
  – SLAC associates
  – Visitors
Scientific Opportunities

- Cosmology
  - Standard model cf particle physics
  - Measurement and consistency checks
  - Beyond the standard model
  - Discovering “What” to Explaining “Why”
    - Dark energy and matter
    - Inflation
    - Baryogenesis

- Particle Astrophysics
  - GLAST science
  - X-ray astronomy, neutrinos, radio astronomy
  - UHECR

=> MAJOR PROJECTS
A. Match faint source pairs, quads, arc fragments etc to derive accurate surface potential.

B. Measure more z's to get very accurate $D_{ds}/D_{os}(z)$ and perform cosmography

C. Ultimate goal is to get $a(t)$. 
Gamma Ray Bursts

- Supernova scale explosions probably involving formation of black holes with petagauss fields
- Release energy in seconds emit as gamma rays
- Relativistic jets lasting a year making afterglow
- May accelerate UHE CR (50J)
- Rapidly developing field elucidating pulsars and quasars
Databases

• New era for observational astronomy
• Large synoptic telescopes studying sky every few days
  – LSST dedicated optical telescope to study lensing etc
  – EXIST Hard X-ray survey telescope
• 30PB envisaged
• Interface to National Virtual Observatory
• Possible KIPAC/Stanford role?