Kavli Institute for Particle Astrophysics and Cosmology

History

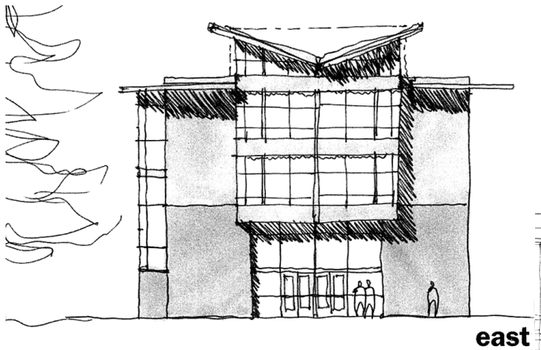
- 2000 Joint campus -SLAC study of opportunities in particle astrophysics and cosmology and proposal to establish an Institute
- 2001 Chen Institute announced
- 2002 Director search
- Jan 2003 Kavli gift announced and Blandford and Kahn accept positions
- March 2003 Inauguration

Future Plans

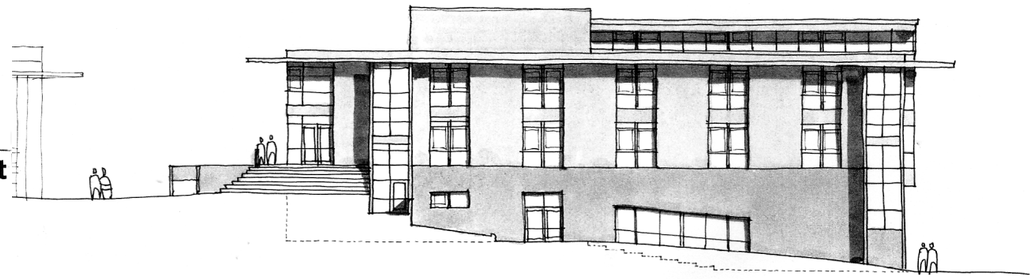
- May 2003 Kahn arrives
- May 2003 Local area meeting
- July/August 2003 Blandford arrives
- Sept 2003 Postdocs/Visitors arrive
- Dec 2003 DOE/NASA/NSF Meeting Washington
- March 2004 Beyond Einstein Meeting Stanford
- Sept 2004 2 new faculty?
- Dec 2004 Texas Symposium
- Sept 2005 2 new faculty?
- Oct 2005 Fred Kavli Building

Kavli Institute Building

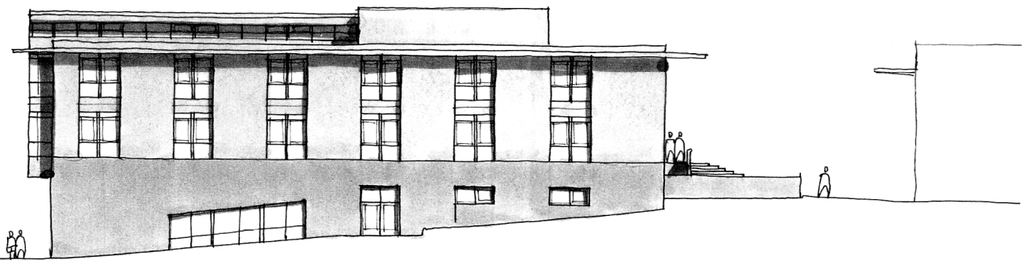
Feasibility Study for the
Particle Astrophysics and Cosmology Center



east



south



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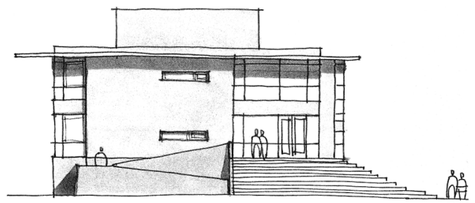


west

Information Center

Rationale

- Particle Astrophysics and Cosmology
  - Interpeted 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
  - Postdocs: Baltz, Frolov, Ho*, Marshall, Peterson*, Sako*, Spitkovsky*? (*external support)
  - Students: 4
  - Visitors: 3 senior, 5 junior

Staffing (cont'd)

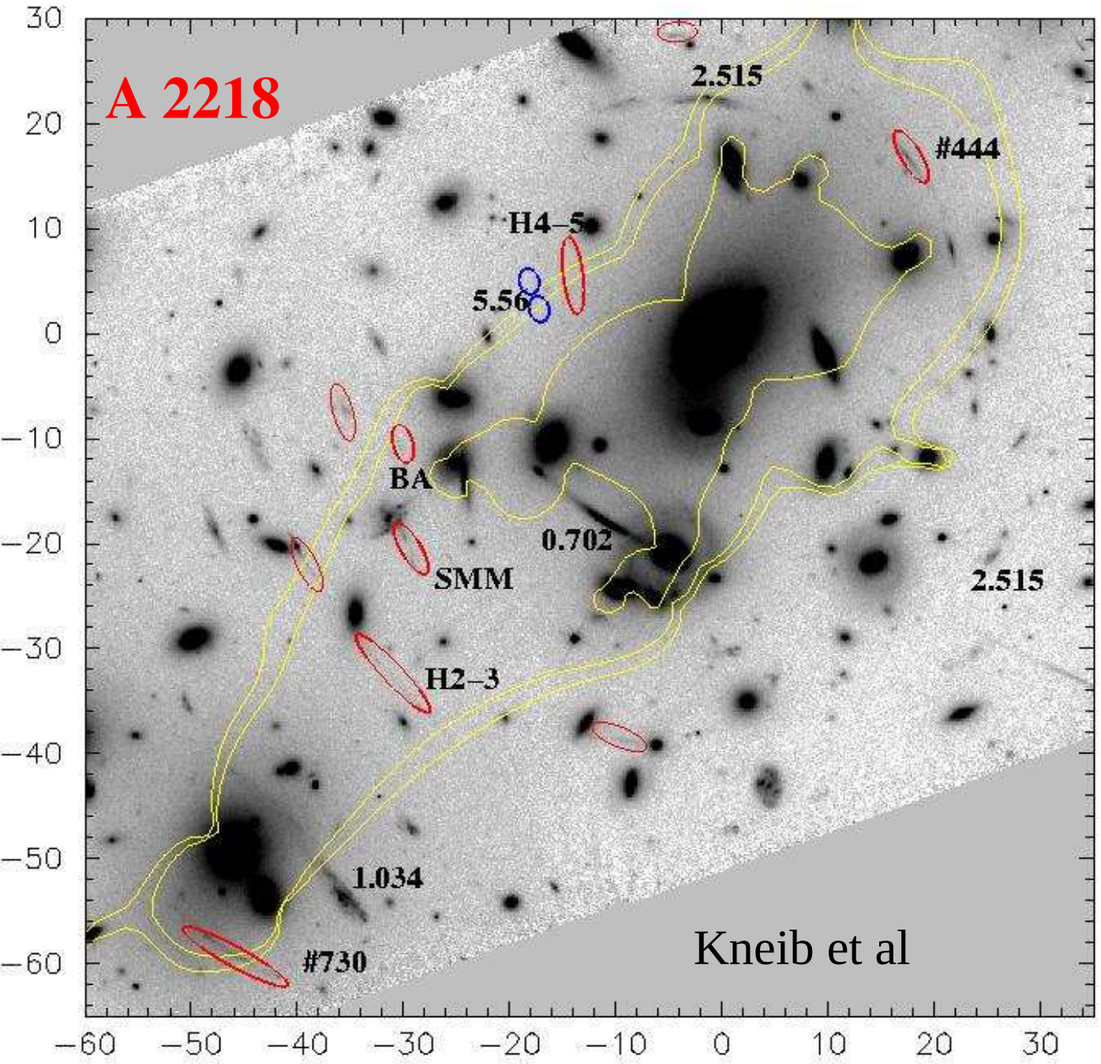
- 2004-
  - 2 ass't prof (1 theory, I expt)
  - .....
- ~2008
  - 9 KIPAC faculty, joint campus-SLAC
  - ~100 KIPAC personnel
  - Campus associates (Byer, Cabrera, Church, Michelson, Romani, Petrosian, Wagoner....)?
  - SLAC associates
  - Visitors

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

=> MAJOR PROJECTS

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



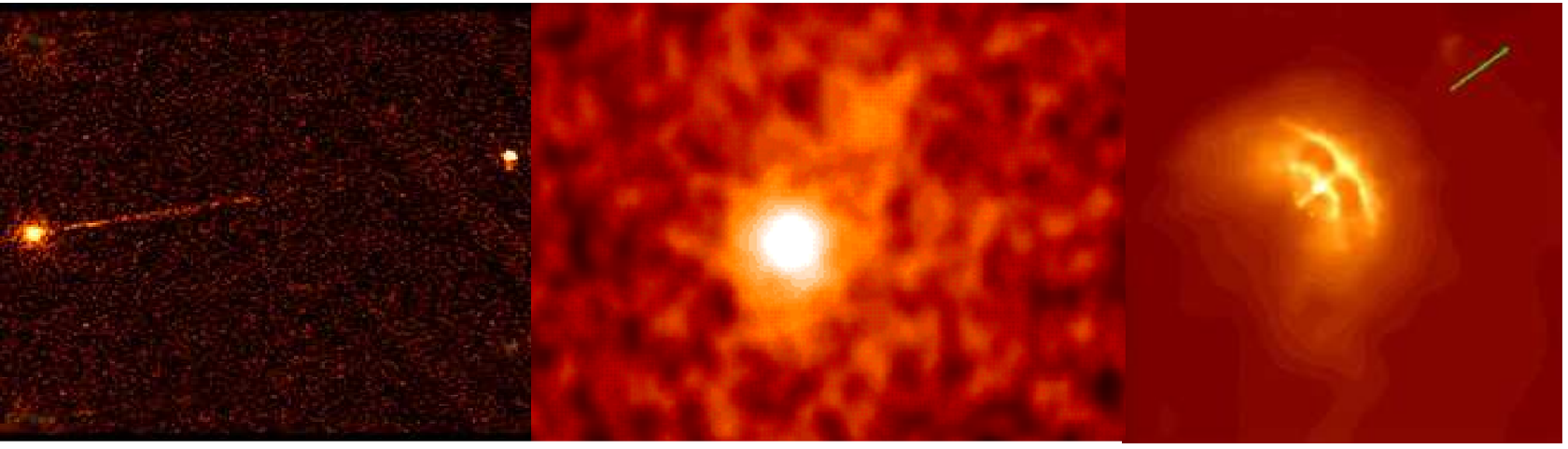
A. Match faint source pairs, quads, arc fragments etc to derive accurate surface potential.

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 ?