SLAC as an LSST User Facility

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SLUO Meeting
LSST

Large Synoptic Survey Telescope

syn·op·tic (adj.)

Pertaining to or forming a synopsis; furnishing a general view of some subject.
LSST

Large Synoptic Survey Telescope

proposed ground-based telescope

first light 2014
LSST

Large Synoptic Survey Telescope

proposed ground-based telescope

classify dark energy & dark matter

DETF Stage IV project
LSST

Large Synoptic Survey Telescope
proposed ground-based telescope
characterize dark energy & dark matter
survey Milky Way and solar system
explore transient optical sky
not the most remote
most expensive
biggest collaboration

SNAP, ILC, DUSEL, LSST, ATLAS, GLAST, SuperB...

astronomy project

substantial interest from traditional HEP users

cosmology/astrophysics learning curve
LSST Organization

**LSST Project**
- Brookhaven
- Caltech
- Carnegie-Mellon
- Columbia
- Google
- Harvard-Smithsonian CfA
- Johns-Hopkins
- Las Cumbres Observatory
- Livermore
- NOAO
- Princeton
- Purdue
- Research Corp.
- SLAC
- Stanford - KIPAC
- Penn State
- U of Arizona
- UC Davis
- UC Irvine
- Urbana-Champaign
- UC of Pennsylvania
- UC of Pittsburgh
- UC of Washington

**Science Collaborations**
- Supernovae
- Weak lensing
- Stellar populations
- Active galactic nuclei
- Solar system
- Galaxies
- Transients / variable stars
- Large-scale structure / BAO
- Milky Way structure
- Strong gravitational lensing
HEP Groups in LSST

Brandeis – Jim Bensiger (fac), Kevan Hashemi, Hermann Wellenstein (tech)

Caltech – Alan Weinstein (fac)

Columbia – Stefan Westerhoff (fac)

Florida State - Kurtis Johnson, Jeff Owens, Harrison Prosper, Horst Wahl (fac)

Harvard – Chris Stubbs (fac), John Oliver (tech)

Ohio State – Klaus Honscheid, Richard Hughes, Brian Winer (fac)

Purdue – John Peterson, Ian Shipsey (fac)

Stanford – Pat Burchat (fac)

UC- Irvine – David Kirkby (fac)

UCSC – Terry Schalk (fac) + new hire

U. Cincinnati – Brian Meadows, Mike Sokoloff (fac)

Urbana-Champaign – Jon Thaler (fac)

U. Pennsylvania – Bhuvnesh Jain (fac), Rick Van Berg, Mitch Newcomer (tech)

U. Washington – Leslie Rosenberg (fac)

Wayne State – David Cinabro (fac)
WHY LSST?

Fundamental physics

dark matter & dark energy, gravity, neutrinos

Some LSST design problems familiar to HEP

large-scale data processing, silicon detectors,
end-to-end simulation

SLAC’s involvement
CHALLENGES

New science
New culture
Project is decentralized
OPPORTUNITIES

SLAC could play key role in lowering barriers for HEP users

Increased HEP user participation would increase SLAC impact on project

Alternative is that SLAC functions as large university group
Bridging the Gap

How does a HEP university PI get up to speed?

• teach cosmology, astronomy courses
• network with experts
• attend conferences, collaboration meetings, ...
• write proposals
• get involved in near-term projects
• hire “transition” postdoc, eg, BABAR/LSST
• take sabbatical
HEP collaborations rely on extensive electronic communication via a central hub.

email & login accounts, mailing lists, hypernews, web space, databases, ...

SLAC could serve as an LSST hub for users

hub is “virtual” but needs real centralized resources to be effective
COMMUNICATION

Project culture of infrequent collaboration meetings is serious obstacle to HEP users
COMMUNICATION

SLAC can help fill the gaps by hosting meetings and tutorials aimed at the HEP community.
FUNDING

Agencies are not ready (or able) to recognize LSST involvement as a university group activity.

SLAC can help

MOUs

letters of support

joint proposals for DOE DE R&D funds
Near-Term Projects

Involvement in near-term projects is crucial for KIPAC as well as LSST HEP users

DES, BOSS, PanSTARS, ...

This is an opportunity for SLAC to build and energize the LSST user community today

Requires user involvement in near-term planning
Visitor Program

Postdocs and faculty on sabbatical need space

Could imagine rotating LSST user population resident at SLAC of 10-15

Experts and novices should share hallways to create optimum intellectual environment

What are plans for visitor space in KIPAC and ROB?

A formal sabbatical program would provide a significant incentive for attracting productive users
Analysis Activities

Main activity during 2014-2024

SLAC ATLAS analysis activity already mature

Data storage and access requires significant computing infrastructure

Natural role for SLAC

Project is “Open Source, Open Data”

Users would benefit from coherent strategy and participation in Science Collaborations
OUTLOOK

LSST HEP Personnel

SLAC Users

today 2008
first light 2014
end of survey 2024