Large Synoptic Survey Telescope

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LSST Observatory System and Science Opportunities

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The Large Synoptic Survey Telescope will have an effective aperture of 6.7 meters and an imaging camera with a 9.6 deg² field of view. It will be dedicated to a ten-year imaging survey of 20,000 deg² of the sky in six broad optical bands. Each area of the sky will receive over ~2000 15-second exposures, allowing a multi-color study of the variable universe on timescales from seconds to a decade, and a deep stack to r~27.7. The resulting petabytes of data will be made available to the US community for scientific investigations ranging from the properties of near-Earth asteroids, to characterizations of dark energy from strong and weak lensing, galaxy clustering, and distant supernovae. Almost a dozen LSST Science Collaborations are actively laying the groundwork for first light: working on image analysis algorithms and database design, exploring cadence choices, developing commissioning plans, and outlining scientific opportunities. These Collaborations have over 200 members to date, with membership open to the US community via an application process administered by NOAO.

Observatory at Cerro Pachón in Chilean Andes
(close to SOAR, Gemini-South telescopes)

Primary mirror was cast in 2008;
Steward Observatory Mirror Lab

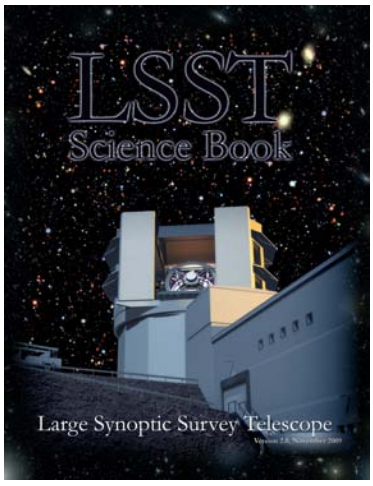
Main Survey will cover 20,000 deg², with ~2000 repeat 15-second exposures over ten years on each 9.6 deg² field of view, spanning *ugrizy* (0.32 – 1.1 micron).
5σ depths after two exposures: 23.9 (*u*), 25.0 (*g*), 24.7 (*r*), 24.0 (*i*), 23.3 (*z*) and 22.1 (*y*).
Depth at the end of the survey: 26.3 (*u*), 27.5 (*g*), 27.7 (*r*), 27.0 (*i*), 26.2 (*z*) and 24.9 (*y*).
10% of survey time devoted to going deeper for high-z supernovae, faint KBOs, etc.

Eleven Science Collaborations and their Chairs

- Solar System: R. Lynne Jones and Steve Chesley
- Stellar Populations: Kevin Covey and Abi Saha
- Milky Way Structure and the Local Volume: Beth Willman
- Transients and Variable Stars: Lucianne Walkowicz and Josh Bloom
- Galaxies: Harry Ferguson
- Active Galactic Nuclei: W. Niel Brandt
- Supernovae: Michael Wood-Vasey
- Strong lensing: Phil Marshall
- Large-Scale Structure: Hu Zhan
- Weak Lensing: David Wittman and Bhuvnesh Jain
- Informatics and Statistics: Kirk Borne

- **Median delivered image quality of 0.67" in *r*.**
- **Can cover all the available sky (~13,000 deg²) in a given filter in roughly 3 nights.**
- **Probes of variability on timescales from 15 seconds to 10 years.**
- **Stellar photometric calibration to 1% or better; stellar repeatability to 0.5%.**
- **Astrometry to 10 mas per visit, allowing proper motions uncertainty of 0.2 mas/year, and parallax uncertainty of 1 mas over the course of the survey.**

LSST Science Book: 598 pages, 245 co-authors, describing scientific capabilities of the survey in detail. Available at http://www.lsst.org/lsst/scibook



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- **Read the posters in this session**
- **Visit the LSST booth**
- **Visit http://www.lsst.org**
- **Apply to join an LSST Science Collaboration**
- **Talk to the co-authors of this poster, or anybody else in the project!**

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