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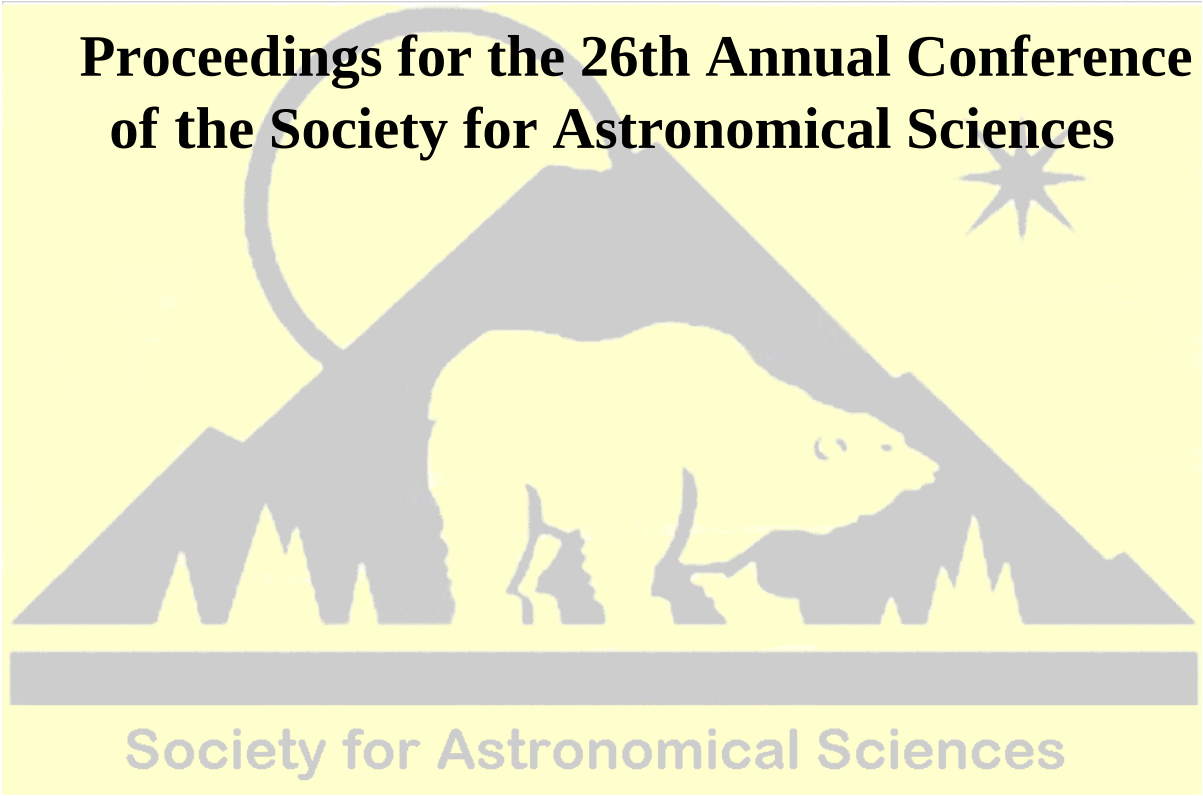


# Symposium on Telescope Science

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**May 22-24, 2007**
**Northwoods Resort, Big Bear Lake, CA**

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# Time-Series Astronomical Photometry Conference

**Equipment, Techniques, and Research Opportunities for Smaller Observatories**

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**Conference will be held 22-24 June 2007**
**California Polytechnic State University**
**San Luis Obispo, California**

## INTRODUCTION

Thanks to the revolutionary trio of affordable CCD cameras, compact Schmidt-Cassegrain and other go-to telescopes, and highly capable personal computers, smaller observatories have become powerful scientific research facilities. Located in backyards and on college campuses, these observatories are making precise scientific measurements across a broad spectrum: tumbling asteroids, pulsating stars, eclipsing binaries, transiting planets, and sputtering matter as it spirals onto white dwarfs and neutron stars. The amateurs, students, and professors who utilize these observatories have produced a steady stream of high-quality papers, and regularly speak about their results at astronomical conferences.

Although some smaller observatories make astrometric and spectroscopic observations, the bulk of the measurements reported in the scientific literature are photometric time series—changes in the brightness and color of astronomical objects over time. Broad-band photometric measurements, as opposed to highly spread-out "narrow band" spectrographic measurements are well-suited to the meager photons available to smaller telescopes. Time series photometric observations, where one object, such as a star or asteroid, is observed continuously for many hours or even night after night, require considerable telescope time—a precious commodity rationed out in small portions to researchers at larger mountaintop observatories but readily available at smaller observatories.

Astronomical surveys, such as the Sloan Digital Sky Survey (SDSS) and the GNAT-MOTESS Survey, have produced a large number new objects whose light varies over time—pulsating stars, eclipsing binaries, asteroids, possible transits of planets across distant stars, etc. The problem with many of the objects these surveys turn up is they have only been observed a few times—"snapshots" caught now and then during the course of a survey. Understanding these objects requires a "movie," i.e. a series of closely-spaced, essentially continuous photometric observations, and this is exactly where appropriately equipped and operated smaller observatories shine.

**CONFERENCE**

Establishing, maintaining, and operating a modern smaller observatory equipped with computerized go-to telescopes, CCD cameras, and high-end PCs is no mean feat. To allow efficient operation, many smaller observatories are at least partially automated. Startup is manual, but once the object is acquired, it is automatically tracked and the data automatically recorded. CCD photometry produces large volumes of data—typically about a gigabyte per night. Data reduction and analysis is a somewhat complex process utilizing sophisticated software. The bottom line is that while modern, well-equipped smaller observatories can produce a high volume of cutting-edge science at surprisingly low cost, they are high-tech facilities/operations that require considerable practical knowledge. That is where the Time Series Astronomical Photometry Conference comes in. Its objectives are twofold: (1) to provide practical guidance with respect to photometric equipment and techniques for smaller observatories, and (2) to highlight the many research opportunities available to these observatories.

**TALKS, TUTORIALS, AND WORKING SESSIONS**

Talks, tutorials, and working sessions are invited in the following areas:

Overview Topics
** Pro-am Cooperation in astronomy
** Undergraduate astronomical research
** Surveys producing new objects to study

Telescopes and Observatories
** SCTs and other commercial telescopes
** Design and construction of small telescopes
** Telescope control systems
** Telescope control software
** Automating (or semi-automating) observatories
** Remotely accessed and robotic observatories

CCD Cameras (and other photometers)
** Introduction to CCD cameras
** CCD cameras today
** Aperture (IR) photometers

Photometry
** Photometry essentials
** Photometry reduction software
** Analysis software

Specific Observing Programs
** Asteroid photometry
** Short-period intrinsically variable stars
** Long-period intrinsically variable stars
** Eclipsing binaries
** Cataclysmic variables
** Planetary transits
** Microlensing