The Nearby Supernova Factory

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Weaver

HPWREN Users
Meeting
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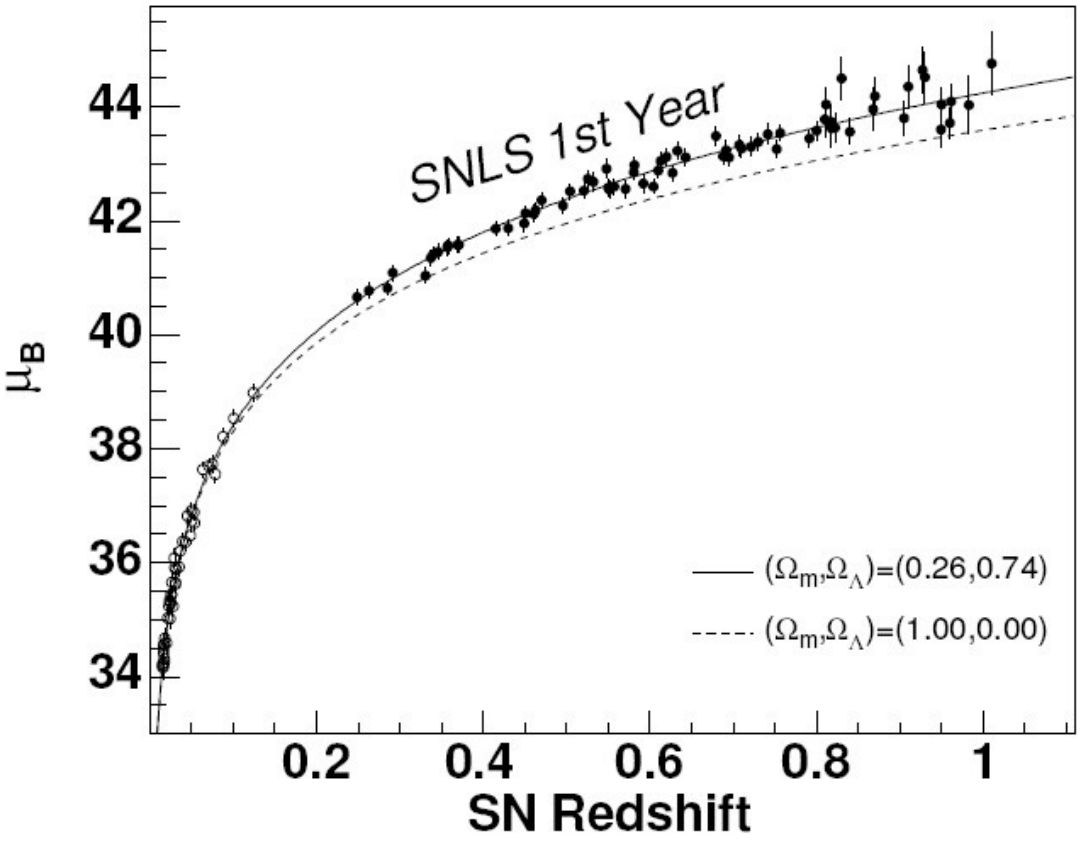
http://snfactory.lbl.gov

SNF Collaboration

- **Lawrence Berkeley National Laboratory**: G. Aldering, C. Aragon, S. Bongard, M. J. Childress, S. Loken, P. Nugent, S. Perlmutter, K. Runge, R. C. Thomas, B. A. Weaver
- **Yale University**: C. Baltay, A. Bauer, D. Rabinowitz, R. Scalzo
- **Laboratoire de Physique Nucléaire et de Haute Energies de Paris**: P. Antilogus, S. Bailey, R. Pain, R. Pereira, C. Wu
- **Centre de Recherche Astronomique de Lyon**: E. Pécontal, G. Rigaudier
- **Institut de Physique Nucléaire de Lyon**: C. Buton, Y. Copin, E. Gangler, G. Smadja, C. Tao
- **Institute for Astronomy, University of Hawai‘i**: D. Birchall
- **New Mexico State University**: J. Cough, J. Holtzman

Background

- Accelerating Expansion discovered 1998
- 2007 Gruber Prize in Cosmology (G. Aldering, P. Nugent, R. Pain, S. Perlmutter)
- 70% of the Universe is Anybody's Guess
- Distant supernovae easier to find



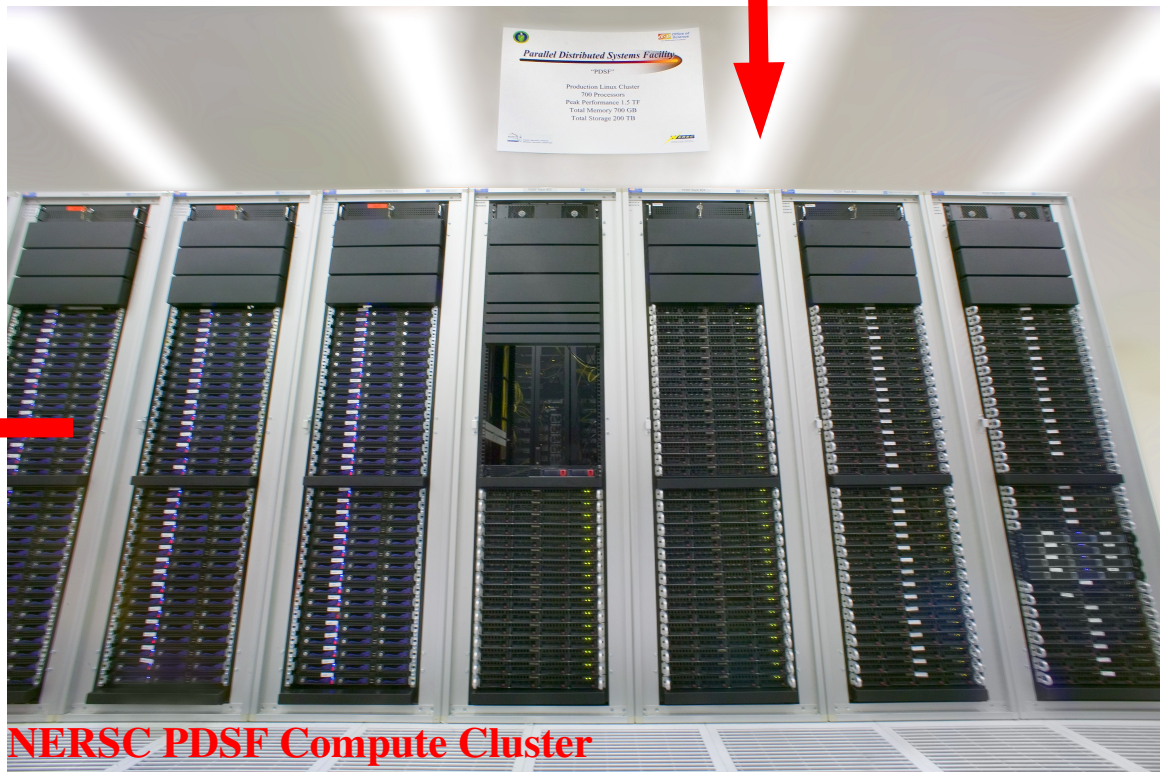
SNF Overview

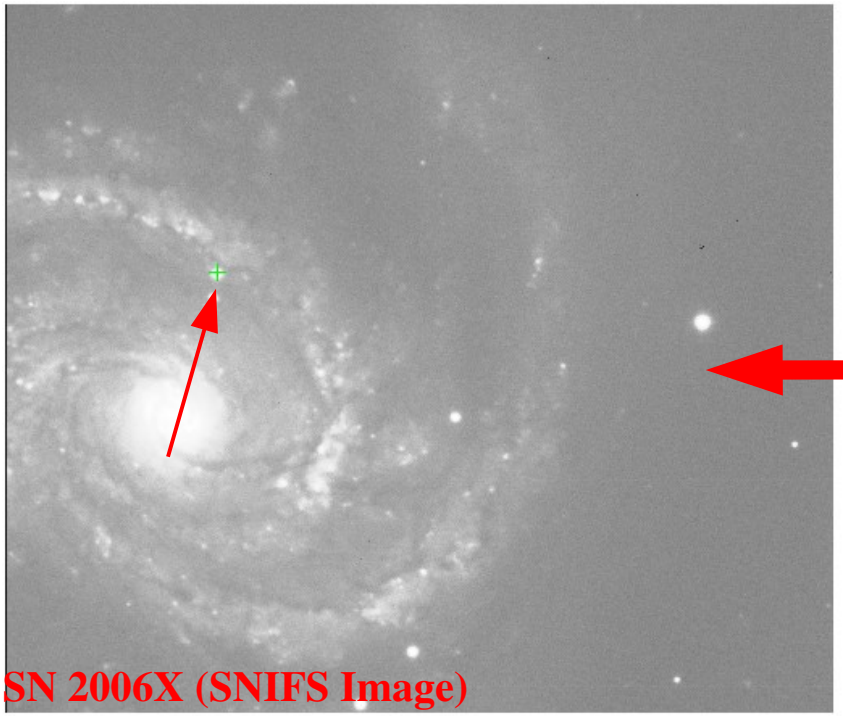
- Find & study supernovae in nearby galaxies
- Search on Mt. Palomar (Oschin 48 inch Schmidt)
- Follow-up on Mauna Kea (UH 88 inch)
- High performance networking critical
- Create public database of supernova spectra
- Deeper understanding of Type Ia physics & cosmology

SNF Data Flow

HPWREN

~30000 images/night
~40 GB/night
Near real-time



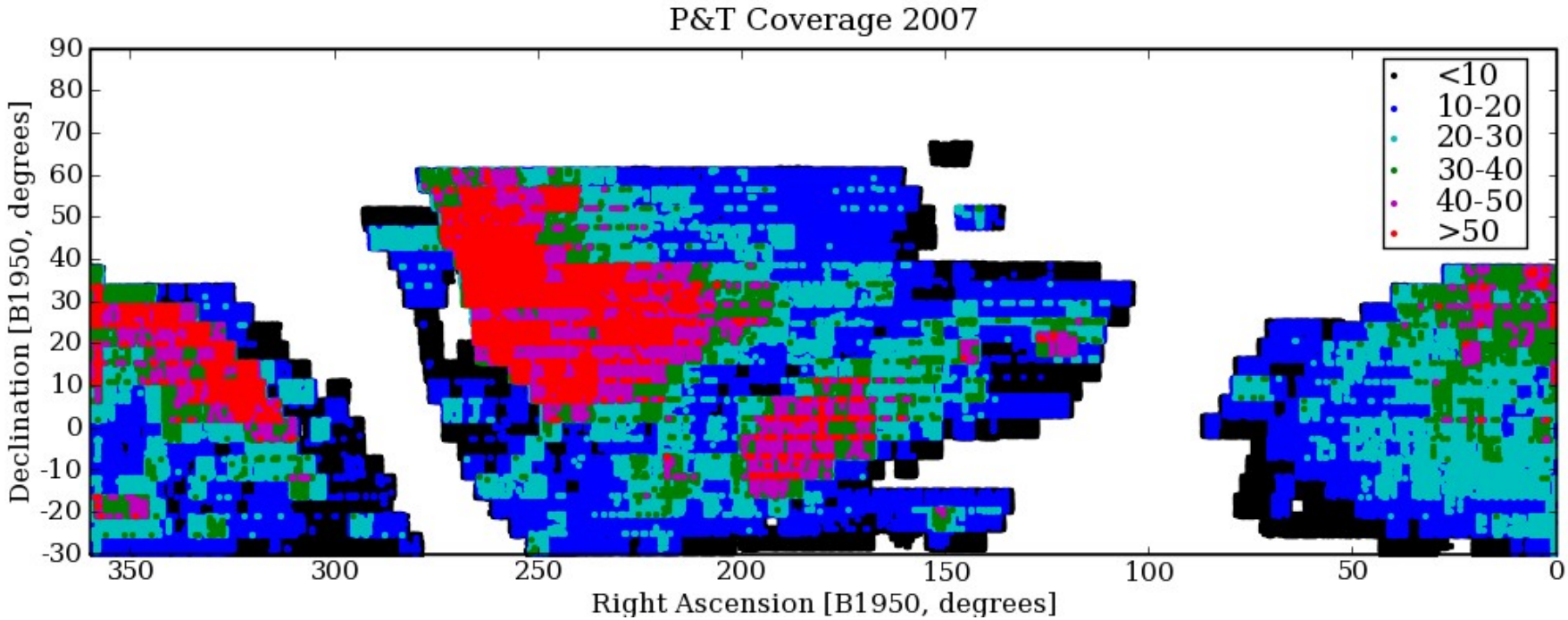


Discoveries

- Over 250 confirmed thermonuclear SNe, over 150 core collapse SNe
- SN2005gj: A thermonuclear SN with circumstellar gas
- SN2006D: A thermonuclear SN in which some carbon escaped burning
- SN2007if: A thermonuclear SN possibly heavier than the Chandrasehkar mass

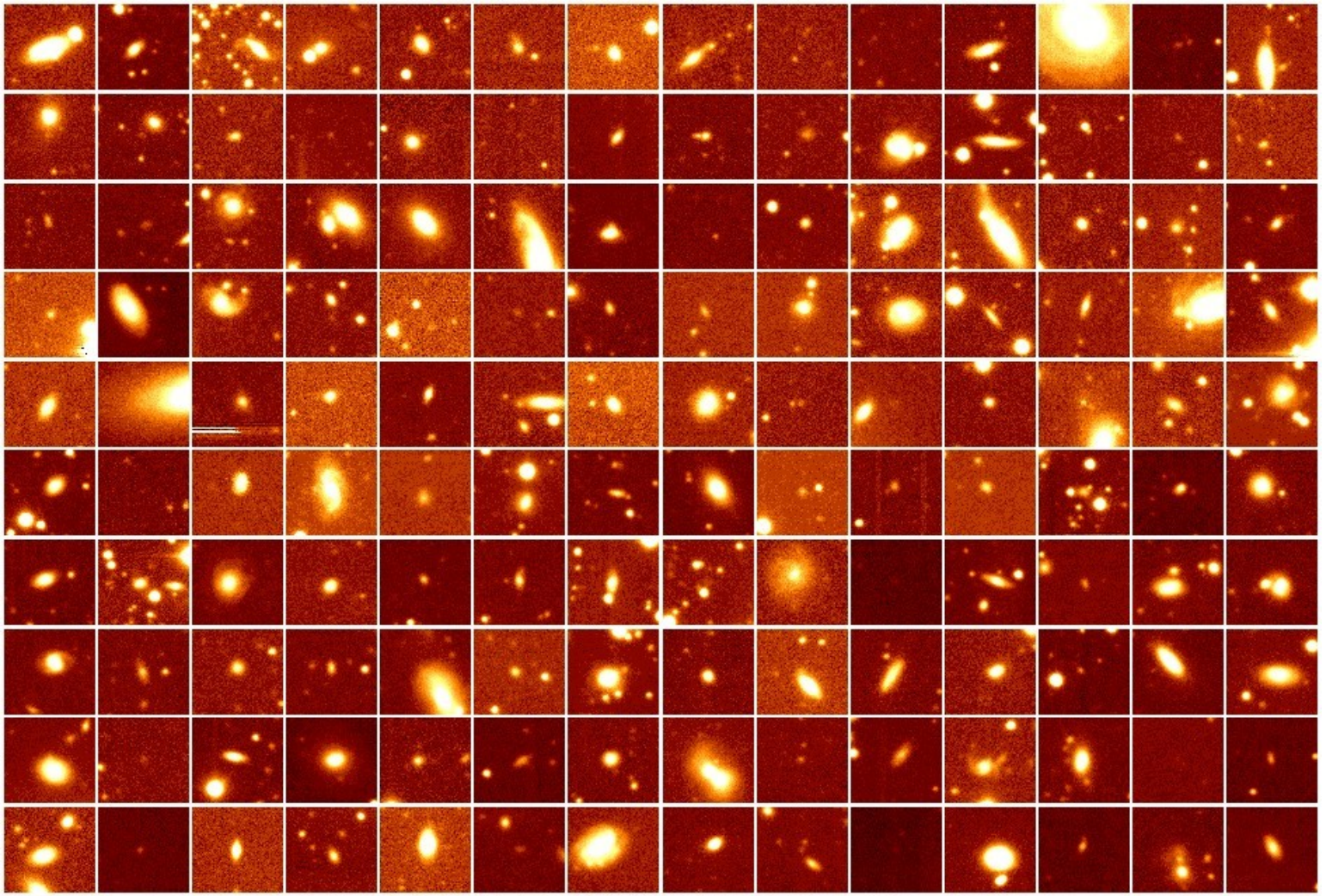
Rolling Search

- Revisit areas of sky on ~7 day timescale
- Coordinate with Trans-Neptunian Object search
- Near real-time data transmission & processing



Deep Imaging

- Repeated images can be added together
- Study hosts of SNe



Future Plans

- Continue Search April-September 2008
- “Palomar Transient Factory” to start in October 2008 with a new camera
- Current Palomar-QUEST camera to move to LaSilla, Chile for southern hemisphere search
- LBNL/UCB dark energy space mission concept strongly endorsed by NAS panel