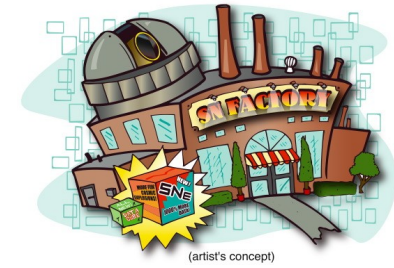


The Nearby Supernova Factory

Benjamin Alan
Weaver
HPWREN Users
Meeting
3 November 2006





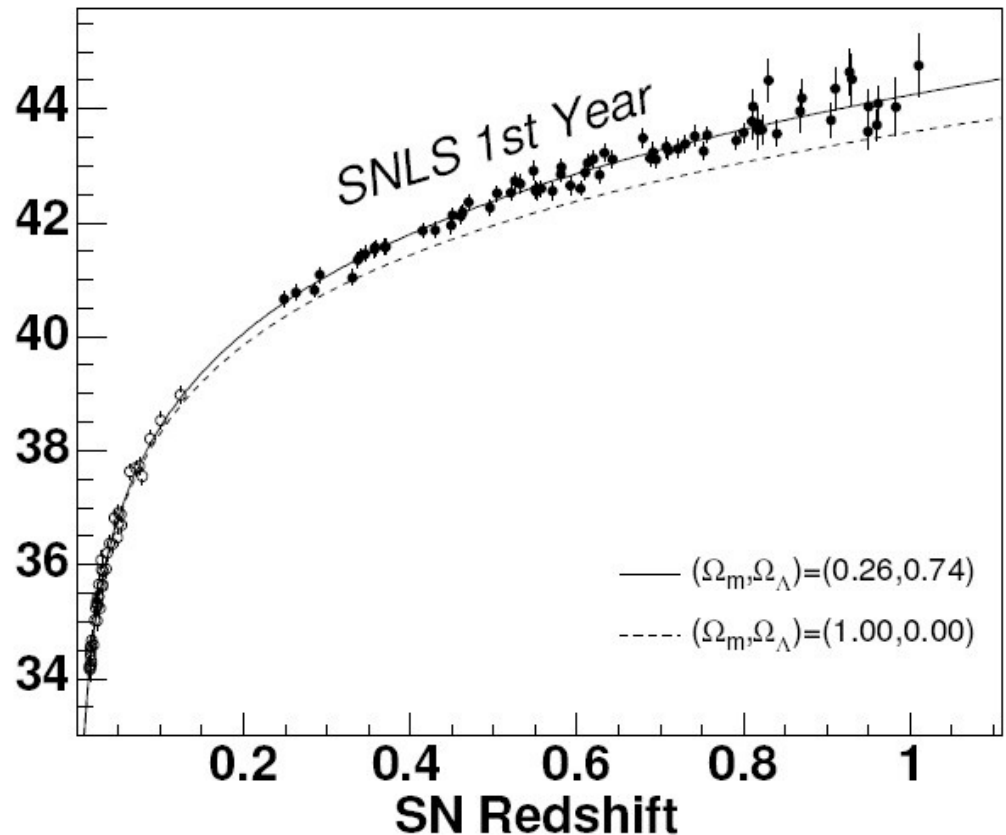
SNF Collaboration

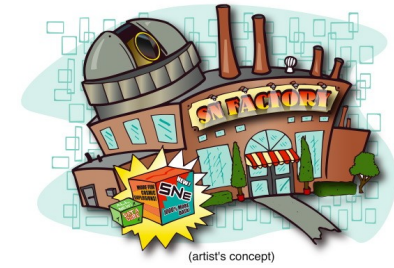
- **Lawrence Berkeley National Laboratory:** G. Aldering, C. Aragon, S. Bailey, S. Bongard, M. J. Childress, S. Koshy, S. Loken, P. Nugent, S. Perlmutter, K. Runge, R. Scalzo, R. C. Thomas, B. A. Weaver
- **Yale University:** C. Baltay, A. Bauer, D. Herrera, D. Rabinowitz
- **Kavli Institute for Cosmological Physics, Chicago:** R. Kessler
- **Laboratoire de Physique Nucléaire et de Haute Energies de Paris:** P. Antilogus, S. Gilles, R. Pain, R. Pereira
- **Centre de Recherche Astronomique de Lyon:** E. Pécontal, G. Rigaudier
- **Institut de Physique Nucléaire de Lyon:** C. Buton, Y. Copin, E. Gangler, G. Smadja



Background

- Accelerating Expansion discovered ~1999
- 70% of the Universe is μ_B 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



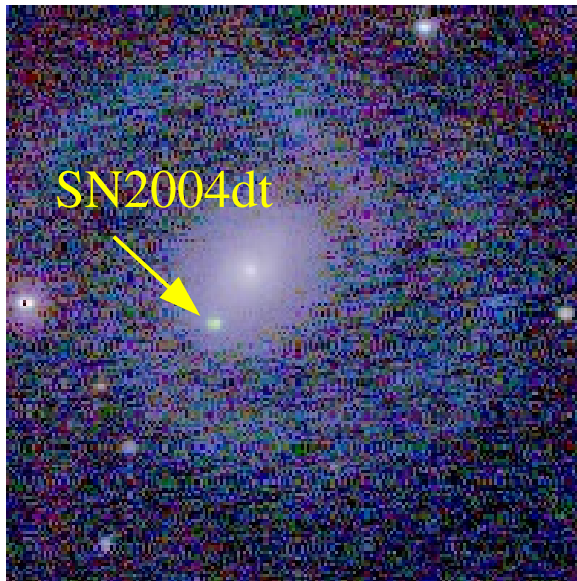
Palomar 48 inch Schmidt
NEAT/QUEST Data

HPWREN

~35000 images/night
~50 GB/night



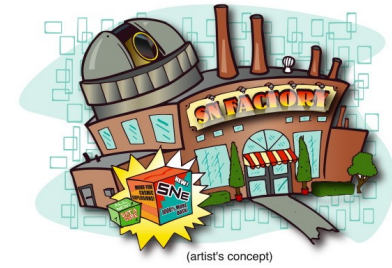
HPSS Mass Storage



Supernovae!

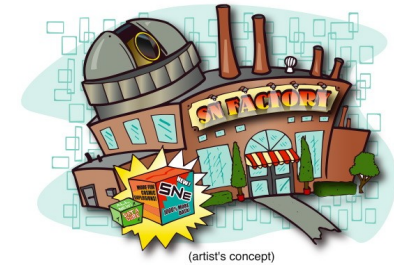


NERSC PDSF Compute Cluster



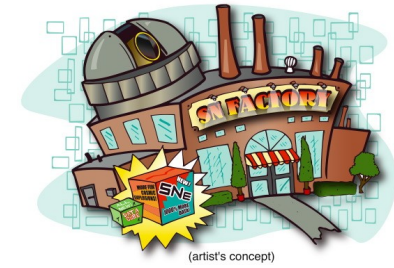
SN2005gj

- G. Aldering *et al.*, “Nearby Supernova Factory Observations of SN 2005gj: Another Type Ia Supernova in a Massive Circumstellar Envelope”, *Astrophys. J.* **650**, 510 (2006).
- “Hybrid” SN Ia/II similar to SN2002ic
- Found in anonymous low-metallicity galaxy
- Type Ia surrounded by large cloud of gas.



SN2006D

- R. C. Thomas *et al.*, “Nearby Supernova Factory Observations of SN 2006D: On Sporadic Carbon Signatures in Early Type Ia Supernova Spectra”, *Astrophys. J. Lett.* submitted.
- Observation of C II (ionized carbon) features.
- Evidence of unburned white-dwarf star material.
- Constraints on white-dwarf explosion models.



Conclusion

- Current search very successful
- Smoothly handling increased NEAT/QUEST data
- Continuous improvement
- Further information at <http://snfactory.lbl.gov>