The Local Environments of Supernovae

Principal Investigator: Dr. Alex V. Filippenko

Institution: University of California - Berkeley

Electronic Mail: alex@astro.berkeley.edu

Scientific Category: RESOLVED STELLAR POPULATIONS

Scientific Keywords: SUPERNOVAE, STELLAR POPULATIONS IN EXTERNAL GALAXIES, YOUNG STAR CLUSTERS IN EXTERNAL GALAXIES, RESOLVED STELLAR POPULATIONS, COSMOLOGICAL PARAMETERS AND DISTANCE SCALE

Total Budget Amount: $80,000

Abstract

The locations of supernovae (SNe) in the local stellar and gaseous environment in galaxies, as measured in high spatial resolution WFPC2 and ACS images, contain important clues to their progenitor stars. They provide accurate determinations of any association of SNe with H II regions or star clusters. Since multi-filter observations are generally available, we can determine the local stellar population, setting constraints on the mass of the progenitor; we can also search for possible attenuation of the SN by dust in the host galaxy by studying the colors of the stars in its environment. By checking the fields for background sources, we can correct the existing SN light curves and luminosities if necessary. When a SN has been observed incidentally, information can be gained on its optical and UV emission. Deep HST images can be used to find light echoes of SNe, as well as recover SNe interacting with circumstellar material at very late times. A direct search for the progenitor stars of SNe can be made in pre-existing HST images of their locations; as the number of archival HST images steadily increases, along with the number of newly discovered SNe, positive identifications become progressively more likely. In Cycle 16, we plan to extend our successful work from previous cycles. This proposal is complementary to our Cycle 16 survey proposal, whose primary purpose is to obtain late-time photometry of SNe. It is also complementary to our Cycle 16 ToO proposal, which is designed to pinpoint the locations of recent SNe to help determine their progenitor stars.

Investigators:

	Investigator	Institution	Country
PI	Dr. Alex V. Filippenko	University of California - Berkeley	USA/CA
CoI	Dr. Schuyler D. Van Dyk	Jet Propulsion Laboratory	USA/CA
CoI	Dr. Weidong Li	University of California - Berkeley	USA/CA
CoI	Dr. Xiaofeng Wang	University of California - Berkeley	USA/CA

Number of investigators: 4

Dataset Summary:

Instrument	No. of Datasets	Retrieval Method	Retrieval Plan
WFPC2	70	FTP	over a one month period
ACS	110	FTP	over a two month period