Abstract Submitted
for the APR12 Meeting of
The American Physical Society

Optimization of Type Ia Supernovae Selection, Photometric Typing, and Cosmology Constraints[1] EDA GJERGO, Argonne National Laboratory, Illinois Institute of Technology, JEFFERSON DUGGAN, JOHN CUNNINGHAM, Loyola University Chicago, STEVE KUHLMANN, RAHUL BISWAS, EVE KOVACS, Argonne National Laboratory — We present results of an optimization study of selection criteria and photometric identification of Type Ia supernovae. The optimization study is the first to include detailed constraints on cosmology, including a time-dependent component of accelerated expansion. The study is performed on a simulated sample of Type Ia and core collapse supernovae from the Dark Energy Survey. In the next decade the number of detected Type Ia supernovae will increase dramatically (Bernstein et al. 2011, Abel et al. 2009), surpassing the resources available for spectroscopic confirmation of each supernova. This has produced an increased interest in the photometric identification of Type Ia supernovae. In order to improve the constraints on the accelerated expansion of the universe, discovered with Type Ia supernovae in the 1990's (Ries et al. 1998, Perlmutter et al. 1999), photometric typing of SN must be very robust. In this study we compare the template-based PSNID algorithm (Sako et al. 2010), with two Type Ia models MLCS2k2 (Riess et al. 2009) and SALT2 (Guy et al. 2007). We allow the pre-selection cuts, based on signal-to-noise ratios, to vary for each model. The optimal model plus pre-selection cuts is determined from the best cosmology constraint.

[1]Department of Energy

Eda Gjergo
Argonne National Laboratory, Illinois Institute of Technology

Date submitted: 07 Jan 2012 Electronic form version 1.4