

Report of the Supernova Working Group

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Activity to Date

- Had two meetings (telecons)
 - April 1
 - April 12
- Jeff Kruk from the Project Office participated in both meetings. This was (and will continue to be) a useful liason with the Project Office

Planned Activity

- In response to the “Primary” Charge
All of the working group will work together to develop the best supernova program for the Omega mission as defined for WFIRST
- In response to the “Secondary” Charge
Some of us will look at alternative mission designs to improve performance or reduce costs (or both)

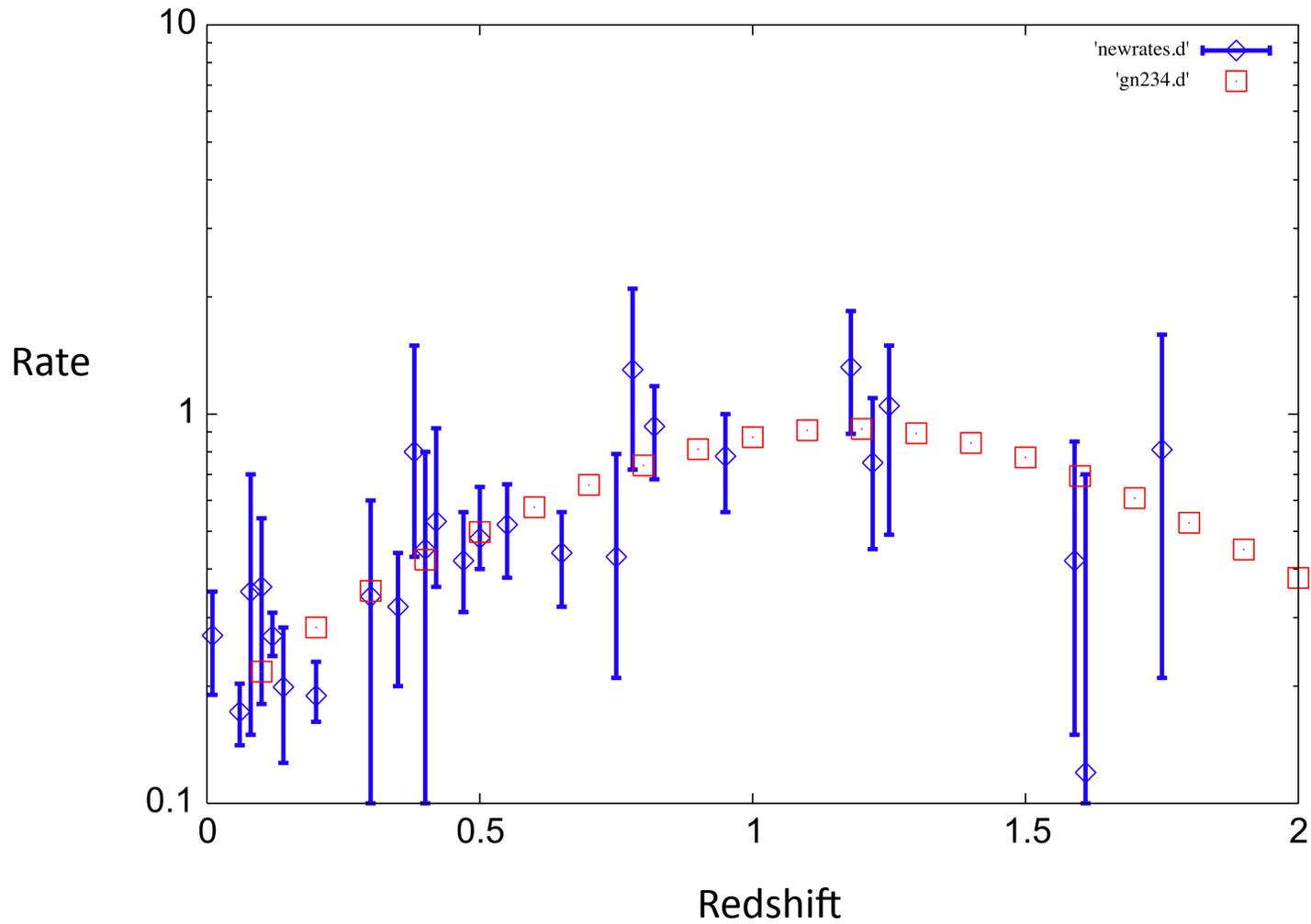
Generic Issues for the SNe Working Group

(Tentative conclusions so far indicated in red)

1. General parameters for the Supernova Survey

- a. Rates agreed on: see “SNe Rates.doc” on our webpage

Type 1a Supernova Rates Data



Generic Issues for the SNe Working Group

1. General parameters for the Supernova Survey

a. Rates agreed on-see “SNe Rates.doc” on our webpage

b. Supernova observed absolute magnitude

$M = -18.774$ at 80th percentile

c. SNe intrinsic spread remaining after correction with...

i. Conventional stretch (lightcurve) correction

optical rest frame B 16%

optical rest frame Z 15%

infrared rest frame J 13%

infrared rest frame H 12%

ii. using spectral feature ratios

present state of the art 12%

d. S/N required on lightcurve points with extinction

i. near peak

ii. 15 days past peak

Generic Issues for the SNe Working Group

- e. S/N required on spectra
 - i. for use in making lightcurves
 - ii. for identification of SN Ia
 - iii. for spectral feature indicators
- f. Calibration requirements and errors
 - use 1.5% for total systematic errors for starters
- g. Assumptions on read noise and dark current
 - dark current: 0.05 electrons/pixel/second
 - read noise 20 e- per frame read, 5 e- per exposure
- h. Efficiencies, throughput, and shutter open time
 - throughput and detector QE included in “Effective Area” tables on our webpage. Shutter open time:
 - no loss due to data transfer (antenna with gimbals)
 - readout, slew and settle time 40 seconds; assume 90% shutter open time for starters

Generic Issues for the SNe Working Group

- i. S/N obtained for a few typical exposure times at a few z's for imaging, slitless spectroscopy, and IFU spectroscopy for 80-percentile absolute mag
 - j. Lowest redshift that can be observed simultaneously ground and space (for cross calibration on common objects).
2. Specs for spacecraft for different survey modes
 - a. pointing accuracy, repeatability, stability
 - b. roll accuracy, repeatability, stability
 - c. calibration implementation
 3. Continuous Viewing Zone in low-extinction/low-zodi region
 4. First guess survey strategy for 10% of a 5 year mission
 - Continue SNe survey uninterrupted for 2 years
 - One 30 hour visit every 5 days