

Background

The Vera C. Rubin (LSST) Observatory will observe tens of thousands of SNe. It is destined to revolutionize our understanding of the Universe and nature of dark energy. The LSST Rubin SN Cosmology pipeline will process these SN events to end to end to extract distances and dark energy estimates from these raw observations. The abundance of SN events will also mean there will be a lot of scope for sample contamination from non Ia events and hence adequate measures need to be taken to carefully segregate them from the final sample.

Project Goal

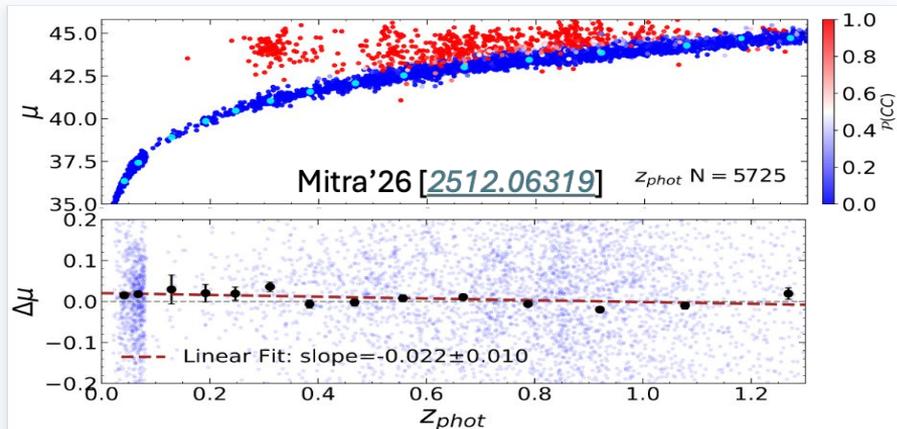
To familiarize using SN cosmology pipeline end to end and use the LSST DEST Time Domain Pipeline to perform/produce: 1. SNIa light curves, 2. Photometric classification of SN types, 3. Simulations, 4. Bias corrections, 5. Hubble Diagram, 6. Dark energy estimation

Necessary Concepts

Fluency in coding and bash shell scripting

Computing Need

Favoured: NERSC/Perlmutter access (requires LSST DESC membership),
Else a computer cluster and SNANA installed



Background Resources

Dark Energy Constraints from Type Ia supernovae
<https://arxiv.org/abs/2401.02929>

Hubble Constant Constraints from Type Ia supernovae
<https://arxiv.org/abs/2408.06153>

Supernova Likelihood from Cobaya
https://cobaya.readthedocs.io/en/latest/likelihood_sn.html

Python
Easily available resources (matplotlib, numpy, scipy)



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