

Inferring physical parameters from SN II Light curves

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Objectives & Research Question:

 Infer the physical parameters of a sample of SNe II comparing ZTF & ATLAS data with hydrodynamical models from Moriya+18.

Results:

• We were able to study the distribution of physical parameters in a sample of 186 SNe

186 SNell sample

186 SNell sample

• Study the distributions of parameters (M, E, M, r_{CSM} , wind β law par., A_V , z).

Background:

Classical models of SNe II could not explain their short rise times. Moriya+18 introduced wind acceleration models. Förster+18 derived physical parameters using a Bayesian approach.

Methodology:

- 1. From a time series of spectra, LCs are simulated for a given Telescope (A_v , z) 2. Synthetic LCs are pre-computed for a



Discussion:

grid of physical parameters

- 3. Given a set of physical parameters, LC is interpolated from the grid of models
- 4. The posterior distribution of physical parameters are inferred for a given SNe

Data:

SNe II selected with ALeRCE & TNS. LCs using ZTF+ATLAS forced photo.



- We confirm that dense CSM IS required to explain the data
- Our method can estimate redshifts using only the LCs.



Conclusions and Future Work:

• This method can be used to infer the distribution of physical parameters of type II SNe, including the redshift. • We are including more models from Moriya (including ⁵⁶Ni mass), but more

work is required for real-time use.

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