

A new fast SALT2-like SNIa modeling framework

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The Nature of Dark Energy, the mysterious component driving the acceleration of cosmic expansion, is still unknown.

One main approach to constraint its equation of state is to construct a Hubble diagram, the evolution of luminosity distance with respect to the redshift using Type Ia Supernovae (SN Ia) used as luminosity distance indicators.

Measuring distances to SNe Ia requires a model of the SN spectrophotometric evolution, taking into account the intrinsic diversity of SNe Ia.

The model currently in use in the community is called Spectral Adaptive Lightcurve Template 2 (SALT2), developed between 2007 (Guy & al. 2007) and 2010 (Guy & al. 2010).

The state of the art is called SALT2.4 and was trained for the Joint Light Curve Analysis (Betoule & al. 2014). Recently a model update has been published, called SALT3 (Kenworthy & al 2021), with a new training set.

I am currently developing a re-implementation of SALT2 with the goal of improving the general methodology and overall training speed.

In particular, we fit the time of maximum, along with all parameters.

The error model is determined along with the model itself.

Finally, the calibration uncertainty are also propagated in the same minimization.

In this presentation, I will present a short status of the SALT+ development effort, as well as a roadmap for the next few months.

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