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Lemaitre : An independent measurement of the dark energy equation of state from a new set of SNeIa : Dataset and Lightcurve model

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We present the Lemaitre project, an independent effort to measure the Dark Energy equation of state (w,wa) using (1) a new set of type Ia supernovae (SNe Ia) from the ZTF, SNLS (years 4 and 5), and Subaru/HSC surveys, covering the redshift range $0.02 < z < 1.3$, (2) a completely new cosmology inference pipeline. The Lemaitre effort aims to address the tension between recent (w,wa) measurements and LCDM predictions.

In this talk, we provide an overview of the Lemaitre project, starting with the dataset. We
present a general overview of the dataset, we discuss the surveys, data selection criteria and the calibration chain.

Constraining the Dark Energy equation of state with SNe Ia requires precise measurements of SN Ia standardized luminosity distances. To derive these distances the inference chain relies on an empirical spectrophotometric model of SNe~Ia, trained on the dataset used for the Hubble diagram. In this talk, we present a key component of the Lemaitre inference chain: a new framework for training empirical spectrophotometric models called 'NaCl' (Nouveaux Algorithmes de Courbes de Lumière). This framework is able to efficiently train a model while propagating all known sources of errors and systematics (measurement- and calibration- but also modeling-uncertainties) in the training, enhancing the accuracy of the lightcurve parameters used in the cosmological analysis.

We present results of trainings performed using NaCl on realistic simulations of the LEMAITRE dataset. We show that NaCl can accurately describe SN Ia lightcurves and spectra, providing a robust framework for the LEMAITRE analysis.

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