

The High-Cadence Transient Survey (HiTS): Early Supernova Light-Curves

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Abstract. Supernovae (SNe) are cosmic explosions which are usually represented in a small region of the luminosity–time-scale diagram when discussing the variable sky. However, there are different time-scales involved in the evolution of SNe that are not reflected by that representation. This talk reviewed some of the physical mechanisms driving the SN light-curve diversity, especially at early times. It then discussed our efforts in the astroinformatics laboratory at CMM and at MAS to discover very young SNe using large etendue telescopes such as Blanco/DECam; those efforts led to the real-time discovery of more than one hundred SNe, some of them very young, under the High cadence Transient Survey (HiTS). We showed that, by comparing hydrodynamical models in the literature with HiTS SNe using Markov Chain Monte Carlo to sample from the posterior in a Bayesian approach, we can constrain the physical parameters that are driving the early time-evolution of these events. We also discussed how these data are being used for different projects, such as the discovery of asteroids and variable stars, and for testing different machine-learning algorithms in an interdisciplinary approach.

Keywords. Stars: supernovæ
