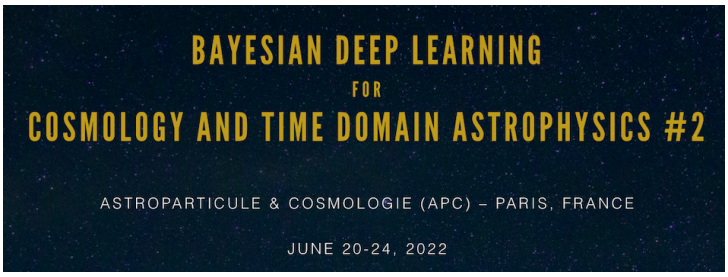

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Amortized variational inference for supernovae light curves

Markov Chain Monte Carlo (MCMC) methods are widely used for Bayesian inference in astronomy. However, when applied to data coming from next-generation telescopes, inference requires a significant amount of resources. An alternative is to use amortized variational inference, which consists of introducing a function that maps the observations to the parameters of an approximate posterior distribution. We evaluate this approach on a set of type Ia supernovae light curves from the Zwicky Transient Facility and show that amortization with a recurrent neural network is significantly faster than MCMC while providing competitive estimates of the predictive distribution. To the best of our knowledge, this is the first time this fast amortized framework is applied to supernova light curves. This approach will be essential when estimating the posterior of astrophysical parameters for thousands of light curves which will be observed by next-generation instruments such as the Vera Rubin Observatory.

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