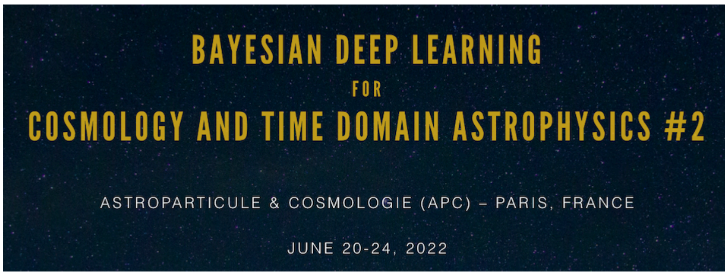

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Interpreting non-Gaussian posterior distributions of cosmological parameters with normalizing flows

Modern cosmological experiments yield high-dimensional, non-Gaussian posterior distributions over cosmological parameters. These posteriors are challenging to interpret, in the sense that classical Monte-Carlo estimates of summary statistics, such as tension metrics, become numerically unstable. In this talk, I will present recent work where normalizing flows (NF) are used to obtain analytical approximations of posterior distributions, thus enabling fast and accurate computations of summary statistics as a quick post-processing step. First (arXiv:2105.03324), we develop a tension metric, the shift probability, and an estimator based of NFs, that work for non-Gaussian posteriors of both correlated and uncorrelated experiments. This allows us to test the level of agreement between two experiments such as the Dark Energy Survey (DES) and Planck using their full posteriors, but also the internal consistency of DES measurements. Second (arXiv:2112.05737), we use the NF differentiable approximation to define a local metric in parameter space. This allows us to define a covariant decomposition of the posterior, which is useful to characterize what different experiments truly measure. As an application, we estimate the Hubble constant, H_0, from large-scale structure data alone. These tools are available in the Python package tensiometer.

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