

## Fast emulation of two-point angular statistics for photometric galaxy surveys

*Wednesday, 28 September 2022 12:00 (20 minutes)*

We develop a set of machine-learning based cosmological emulators, to obtain fast model predictions for the  $C(\ell)$  angular power spectrum coefficients characterising tomographic observations of galaxy clustering and weak gravitational lensing from multi-band photometric surveys (and their cross-correlation). A set of neural networks are trained to map cosmological parameters into the coefficients, achieving a speed-up  $O(10^3)$  in computing the required statistics for a given set of cosmological parameters, with respect to standard Boltzmann solvers, with an accuracy better than 0.175% ( $<0.1\%$  for the weak lensing case). This corresponds to  $\sim 2\%$  or less of the statistical error bars expected from a typical Stage IV photometric surveys. Such overall improvement in speed and accuracy is obtained through (i) a specific pre-processing optimisation, ahead of the training phase, and (ii) a more effective neural network architecture, compared to previous implementations.

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