

Title: Emulators in CMB analyses

The Cosmic Microwave data at very small scales are known to probe not only primordial CMB fluctuations but also many extragalactic components such as in particular thermal and Kinetic Sunyaev Zeld'ovich effects, and Cosmic Infrared Background.

These foregrounds contain a wealth of cosmological and astrophysical information. However, calculating their angular power spectra is complex and demanding in terms of computing resources, which slows down cosmological and astrophysical exploration (for example by MCMC) to derive constraints.

We pioneered the use of emulators for these extragalactic signals, which enabled us to obtain new constraints on their amplitude in the Planck and SPT datasets. I will show how to consistently use the cosmologically dependent SZ signatures (tSZ and kSZ) at small scales to recover not only cosmological parameters but also reionisation history and neutrino mass. Finally, I will show how we have built a new kSZ signal emulator based on numerical simulations dedicated to the reionisation epoch.