

# Improved kSZ modelling with the LoReLi simulations

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Historically disregarded as a foreground contaminant, the kinetic Sunyaev-Zel'dovich (kSZ) effect has seen a surge of interest in recent years as an additional cosmological probe. Arising from interactions between CMB photons and free electrons in ionised bubbles, the kSZ signal contains information about the timeline and morphology of Reionisation, a critical, yet poorly understood, period during which the universe transitioned from neutral to ionised. Because the kSZ field is sourced by highly non-linear physics it can be difficult to model, however its two-point correlation function can be related to that of the free electron overdensity field, or more simply the electron power spectrum. We present early results for characterising the electron power spectrum, and thus the kSZ spectrum, as a function of five astrophysical parameters using the LoReLi database, a set of  $\sim 10,000$  three-dimensional radiative hydrodynamical simulations originally developed to model the 21cm field.

**Auteurs principaux:** MC BRIDE, Elizabeth (Institut d'Astrophysique Spatiale); DOUSPIS, Marian (IAS); GORCE, Adélie (IAS, Université Paris-Saclay)

**Orateurs:** MC BRIDE, Elizabeth (Institut d'Astrophysique Spatiale); GORCE, Adélie (IAS, Université Paris-Saclay)

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