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Better accounting for reionisation in CMB data analysis: the KSZ effect

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CMB data is a crucial source of information about reionisation. Despite the exquisite measurements of Planck on large scales and SPT, ACT or future CMB-S4 experiments on small scales, the way CMB data is currently used to constrain reionisation is coarse.

In this talk, we focus on the kinetic Sunyaev-Zel'dovich effect in the context of patchy reionisation and introduce a new way to relate both the shape and amplitude of its angular power spectrum to reionisation global history and morphology. Until now, only rough scalings of the kSZ amplitude with reionisation duration or midpoint were used. Our approach is based on a novel and extremely simple description of the power spectrum of the free electrons density contrast, however sufficient to describe the physics at stake, as confirmed when applying it to a wide range of simulations. Combined with 21cm intensity mapping, this innovative tool will allow a much more optimal use of future CMB observations to constrain the physics of reionisation.

After introducing this new formalism, I will present the first results obtained when including it in Planck and SPT data analysis and the insights on reionisation that can be deduced from them.

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