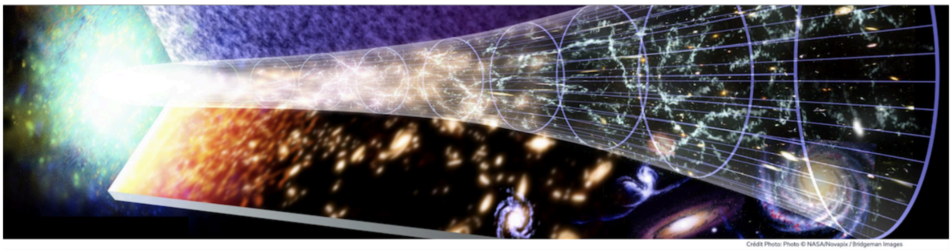

ID de Contribution: **33** Type: **Non spécifié**

Constraining constant and tomographic coupled dark energy with low- and high-redshift probes

mercredi 18 janvier 2023 14:35 (5 minutes)

We consider coupled dark energy (CDE) cosmologies, where dark matter particles feel a force stronger than gravity, due to the fifth force mediated by a scalar field which plays the role of dark energy. We perform for the first time a tomographic analysis of coupled dark energy, where the coupling strength is parametrised and constrained in different redshift bins. This allows us to verify which data can better constrain the strength of the coupling and how large the coupling can be at different epochs. First, we employ cosmic microwave background data from Planck, the Atacama Cosmology Telescope (ACT) and the South Pole Telescope (SPT), showing the impact of different choices that can be done in combining these datasets. Then, we use a range of low redshift probes to test CDE cosmologies, both for a constant and for a tomographic coupling. In particular, we use for the first time data from weak lensing (the KiDS-1000 survey), galaxy clustering (BOSS survey), and their combination, including 3x2pt galaxy-galaxy lensing cross-correlation data. We see that with a tomographic CDE model, there can be a considerable degree of variation in coupling strength between different epochs. When combining CMB and low redshift probes other than weak lensing and galaxy clustering, we see that coupling at redshifts $z \leq 5$ is considerably unconstrained. On the other hand, galaxy clustering and consequently 3x2pt are able to place tight constraints on the coupling strength β, with $\beta \lesssim 0.02$ at 68% C.L. for a constant coupling case, making upcoming galaxy surveys potentially powerful probes to constrain such CDE models.

Orateur: GOH, Lisa (CEA/Irfu/DAp/LCS)