Contribution ID: **55** Type: **Plenary/Parallel talk**

New CMB lensing mass maps from the Atacama Cosmology Telescope and their implications for structure growth

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Dark matter not only provides the invisible scaffolding from which the birth of galaxies takes place, but by studying its distribution in our Universe we can infer a great deal of information regarding the growth of structure and cosmic expansion. Measuring the gravitational lensing of the CMB allows the mapping of all the matter distribution (for which the majority is dark matter) to very high redshifts. New observations with the Atacama Cosmology Telescope will allow CMB lensing measurements to reach higher precision than those derived from Planck, reporting preliminary measurements of CMB lensing at 50σ. This high signal-to-noise lensing spectrum will translate into a few percent determination of σ_8, hence providing a robust test of low amplitudes reported by galaxy lensing surveys and also one of the tightest constraints on the sum of neutrino masses. This measurement also sets the foundation for ground-based high-resolution lensing covering a large fraction of the sky. Novel methods to tackle problems related to atmospheric noise and extragalactic foregrounds, along with almost 200 null tests, were employed to provide this state of the art lensing measurements. In my talk, I will discuss how these methods are implemented in detail, as well as the relevance of our results in the context of cosmological tensions.

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