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Multi-Wavelength Galaxy Cluster Cosmology with the South Pole Telescope and the Dark Energy Survey

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The sample of galaxy clusters selected by the South Pole Telescope (SPT, combining the SPT-SZ and SPTpol surveys) now exceeds a thousand objects. The weak-lensing based mass calibration using Dark Energy Survey (DES) Y3 data will be better than 5%. The joint analysis of the cluster abundance and weak-lensing mass calibration is therefore expected to provide significantly tighter cosmological constraints than the current state of the art. In my talk, I will review the SPT cluster cosmology and mass calibration program. I will focus on the almost completed weak-lensing analysis using DES Y3 data and highlight the current status of the ongoing cosmological analysis.

Primary author: BOCQUET, Sebastian (LMU Munich)

Co-authors: DES COLLABORATION; SPT COLLABORATION

Presenter: BOCQUET, Sebastian (LMU Munich)