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Sensitivity forecasting for the Simons Observatory

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The Simons Observatory (SO) will place new limits on cosmological parameters by measuring fluctuations in the temperature and polarization of the cosmic microwave background (CMB). Achieving these high precision measurements will require state-of-the-art instrumentation with extraordinary sensitivity and carefully-tuned parameters. To assist with instrument development, SO uses BoloCalc, a powerful sensitivity calculator for CMB experiments. BoloCalc quantifies the noise levels of a full end-to-end instrument model by estimating its noise-equivalent CMB temperature (NET) to project realistic science goals. This calculation includes detector properties, pixel density, material tolerances, and realistic passbands. BoloCalc enables an efficient and well-informed design process in which different hardware configurations are easily evaluated on their expected sensitivity. We will give an overview of how sensitivity estimates from BoloCalc informed the SO instrument design with a focus on the detector design and validate its performance by comparing measured noise levels on the Atacama Cosmology Telescope (ACT) with BoloCalc predictions.

Less than 5 years of experience since completion of Ph.D

Y

Student (Ph.D., M.Sc. or B.Sc.)

Y

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