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Polarization Modulator Signal Phase Variation: The Simons Observatory Case

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The Simons Observatory (SO), currently under construction, will deploy one large-aperture (6 m) and four small-aperture (42 cm) telescopes to the Chajnantor Plateau of the Atacama Desert in Chile in the coming years. The small-aperture telescopes feature continuously-rotating half-wave plates (CRHWP) at cryogenic stages in order to modulate incoming polarization from the sky. In this talk, I will review the effects of the transition-edge sensor bolometers, which comprise the detectors of the SO focal planes, on the modulated polarization signal. I will then discuss modeling and simulation of a particular systematic in the detectors, an unmodeled change in the phase delay due to detector time constant variations, and how this can affect recovery of polarization signals from the modulated data. I conclude with a discussion of limits set on detector performance as a result of studies of polarization angle calibration requirements in the context of SO.

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