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## The Simons Observatory and a new framework for constraining cosmic birefringence in the presence of systematics and galactic foregrounds

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The Simons Observatory (SO) is a new generation CMB experiment. It is currently under construction in the Atacama desert in Chile and its first light is planned in 2022. It gathers 60,000 TES detectors on two types of telescopes: 3 Small Aperture Telescopes (SATs) and one Large Aperture Telescope (LAT). This hybrid observatory was shown to be the most efficient approach to study the early and late Universe. 5 years of observations with the SATs will give constraints on the primordial gravitational waves with a precision on the tensor-to-scalar ratio of  $\sigma(r) \sim 0.003$ . To reach these scientific goals, galactic emissions such as dust and synchrotron polarized radiation are a major issue. The SATs and the LAT observe in 6 frequency bands from 27GHz to 280GHz, so that SO will be able to characterize and remove the galactic foregrounds. Systematic effects such as the polarisation angle of our telescope also need to be taken into account. However the conventional self-calibration method deletes possible non zero CMB EB power spectrum which renders impossible any detection of cosmic birefringence. In this talk I will present a new method which aims at constraining both  $r$  and the birefringence angle using foreground cleaned and polarisation angle corrected CMB maps in the context of SO.

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