MEETING OF THE AMERICAN PHYSICAL SOCIETY DIVISION OF PARTICLES AND FIELDS

Contribution ID: **266** Type: **Presentation**

The Simons Observatory: Cosmology and Fundamental Physics from the Cosmic Microwave Background

Tuesday, 1 August 2017 14:50 (20 minutes)

The Simons Observatory (SO) is a next generation observatory optimized to make precise measurements of the comic microwave background (CMB) over frequencies spanning 30-300 GHz. The observatory will be built with a combination of 6 meter class and 1 meter class telescopes and up to 40,000 detector focal-plane arrays to make high fidelity maps over degree to arc-minute angular scales. These data will be used to detect or place stringent limits on primordial gravitational waves, new light relativistic species, neutrino properties, and to make many other astrophysical and cosmological measurements. The SO instrument will be a stepping stone to CMB-S4 which will field hundreds of thousands of CMB detectors across multiple telescope platforms. We will present the status of the design development for the large- and small-aperture SO telescopes, the cryogenic receivers, cold optical elements, and our plan for fielding and reading out tens of thousands of multichroic, superconducting detectors.

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Session Classification: Cosmology and Astrophysics

Track Classification: Cosmology and Astrophysics