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# CMB-S4 Science Book, First Edition

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This book lays out the scientific goals to be

addressed by the next-generation ground-based cosmic microwave background experiment, CMB-S4, envisioned to consist of dedicated telescopes at the South Pole, the high Chilean Atacama plateau and possibly a northern hemisphere site, all equipped with new superconducting cameras. CMB-S4 will dramatically advance cosmological studies by crossing critical thresholds in the search for the B-mode polarization signature of primordial gravitational waves, in the determination of the number and masses of the neutrinos, in the search for evidence of new light relics, in constraining the nature of dark energy, and in testing general relativity on large scales.

Subjects: **Cosmology and Nongalactic Astrophysics (astro-ph.CO)**; General Relativity and Quantum Cosmology (gr-qc); High Energy Physics - Phenomenology (hep-ph); High Energy Physics - Theory (hep-th)

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