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The Large Scale Polarization of the Cosmic Microwave Background¹

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Cosmology has undergone a revolution in the past two decades. Detailed observations of the cosmic microwave background (CMB) have played a crucial role in solidifying the Λ CDM model of the universe. The universe has cooled and expanded over its 13.8 billion year history. It is dominated by dark energy, and the evolution of structure is driven by gravitational action on an initially small inhomogeneity of dark matter. Current data provide strong hints that the universe underwent an exponential expansion in its first fraction of a second. This epoch of inflation provides an explanation for the measured geometric flatness of the universe, a solution to the horizon problem, and a source of the initial inhomogeneity. Inflation predicts a stochastic background of gravitational waves that would polarize the cosmic microwave background in a specific pattern. Measurement of this signal would provide tangible evidence for inflation along with an opportunity to study physics at energies a trillion times higher than those accessible by the Large Hadron Collider. The Cosmology Large Angular Scale Surveyor (CLASS) is an array of microwave telescopes located in the Atacama Desert in Chile that is designed to search for this signal.

¹1636634, 0959349, 1429236