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The Future of Cosmic Microwave Background Observations

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Measurements of the cosmic microwave background radiation (CMB) have led to a remarkable picture of the origin, make-up and evolution of the universe. The measurements provide support for the inflation theory of the big bang. In the broadest sense, the measurements have allowed a full accounting of the stuff that makes up the universe, although we know few details beyond the few percent contributed by ordinary matter. Future measurements will focus on characterizing the temperature anisotropy on finer angular scales and the polarization anisotropy on all angular scales. These measurements can be used to constrain the neutrino mass and the equation of state of the Dark Energy. The most exciting future prospect, and by far the most challenging experiment, is the possibility of detecting the signature of inflationary gravitational waves generated in the first instants of time imprinted on the CMB polarization. After a brief review of the current status and ongoing experiments, this talk will focus on the expectations and challenges for future CMB observations.