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The Cosmic Microwave Background

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Measurements of the Cosmic Microwave Background (CMB) provide our earliest direct information about the evolving Universe. This talk will begin with a summary of how the CMB was produced and why it is important. The focus will than shift to the nature of the experimental challenge of extracting Cosmological information from the CMB. Examples will be given of technology development in small-scale experiments leading to major space missions which produce definitive data sets. The millimeter-wave spectral range of the signals corresponds to the crossover between coherent (radio) techniques and bolometric (optical) techniques. These challenges have stimulated enormous development of bolometric detectors, which are used to measure both the spectrum and the anisotropy of the CMB. The next generation of CMB experiments will require a new generation of bolometric detectors in large format arrays. This year, the Keithly Prize is given to Kent Irwin for ideas that have made this next step possible.