

Next Generation Cosmic Microwave Background Polarimetry Experiment

Cosmic Microwave Background is weakly polarized. A curl component of the polarization, the B-mode, carries wealth of information such as sign of inflation, property of neutrino and evolution of large scale structures. Searches for the B-mode polarization in the CMB are going through an interesting period. Past year, CMB experiments reached sensitivity to make a detection of B-mode from weak gravitational lensing from large scale structures. Also an upper limit from polarization measurement on the primordial inflationary gravitational wave surpassed constraint from temperature anisotropy measurement.

Cosmic Microwave Background community is conducting a study for a next generation experiment call CMB Stage-IV (CMB-S4). CMB-S4 is aiming to deploy 500,000 detectors. This is two orders of magnitude increase in detector count from current experiments. This brings new challenges of mass production and quality control. Our approach is to bring automation and industrialization into the CMB instrumentation. We will discuss how we automated detector quality control, detector packaging and read-out electronics packaging. We will also discuss how we mass produce read-out electronics using lithography technique, and our approach to industrialize anti-reflection coat optical elements using ceramic plasma spray.

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