

## HWP development for LiteBIRD low-frequency telescope

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LiteBIRD low-frequency telescope (LFT) employs a polarization modulation unit (PMU) based on a continuously rotating half-wave plate (HWP) at the telescope aperture. The PMU significantly suppresses  $1/f$  noise and mitigates differential systematics. Therefore, the control and calibration of PMU intrinsic systematics are critical to achieving the scientific goal of LiteBIRD. The LFT PMU consists of a 5 layer stacked sapphire achromatic HWP with sub-wavelength structure anti-reflection coating, and cryogenic contactless rotation mechanism based on superconducting magnetic bearing. LiteBIRD is in the conceptual design phase and we have developed the breadboard model (BBM) of the LFT PMU with an HWP diameter of 330 mm toward a demonstration model with a diameter of around 500 mm. We present BBM development status and summarize the PMU-specific systematics based on a Muller matrix formulation.

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