V LiteBIRD Contributions from IPNS/KEK

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The Experimental Cosmology group (CMB group) at Institute for Particle and Nuclear Studies (IPNS) at High Energy Accelerator Research Organization (KEK) was established in 2007. As the group that made the original proposal of LiteBIRD in 2008, the KEK CMB group has been leading the LiteBIRD concept development. The group has also been contributing to the ground-based CMB projects, including QUIET, POLARBEAR-1, POLARBEAR-2, Simons Array, GroundBIRD and Simons Observatory.

At LiteBIRD the KEK CMB group will contribute to

- On-ground Calibrations of Low-Frequency Telescope (LFT)
- In-flight Calibrations of the Pay-Load Module (in the global data analysis team)
- Assembly Integration and Verification of LFT (under investigation)

Facility: Advanced Instrumentation Laboratory for CMB Research



Heritages from Ground-based Experiments: POLARBEAR-2 Example







PB20.11.01 PB20.11.01 Comb4Ch PB20.11.01 PB20.11.01 Comb4Cl

PB20.11.01 PB20.11.01 Comb4Ch

PB20.11.01 PB20.11.01 Comb27C

PB20.11.01 PB20.11.01 Comb290

PB20.11.01 PB20.11.01 Comb29C

160 (GHz)

PB20.11.01 PB20.11.01 Comb29

102

120

First light !



Achieved First light for PB2/SA !





Beam map Thermal source O. Tajima et. al J. Low Temp Phys. 167, 936 (2012 σ ~ 2deg. (120sec.)

(Relative) Angle Sparse Wire-Grid

Responsivity (sky emulator)

Principle (M. Hasegawa, O. tajima et. al, RSI 82 054501, 2011)

F. Matsuda et. al. arXiv:1904.02901



40

Time constant (Stimulator)





LiteBIRD Calibration Strategy

Requirements flow-down is being developed from science requirements to calibration hardware requirements. This activity is one of the keys to the success of the entire mission. (Details will be given in the talk by Dr. Sophie Henrot-Versille)





	Angular Range
Reference antenna FoV	$\pm 10 \deg x \pm 2 \deg$
Gonio stage	-1 ~ +15 degree
Az rotor	\pm 180 degree
Total	\pm 25 degree
lde	a by Y. Sekimoto