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Semi-blind component separation for measuring the CMB B-mode polarization

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The LiteBIRD satellite mission, an international collaboration led by the Japanese space agency (JAXA), aims to measure the CMB B-mode polarization with high precision, utilizing high-sensitivity instruments and large sky coverage to constrain the tensor-to-scalar ratio with unprecedented precision. The main difficulty in measuring this component lies first in its extremely small amplitude, especially compared to polarized astrophysical foregrounds. One notable component separation method is Spectral Matching Independent Component Analysis (SMICA), a semi-blind method relying on statistical independence of the components to effectively separate them. The method has proven to be successful, being the reference method of component separation in measuring CMB temperature with the Planck mission. The present work revolves around adapting this component separation method to the context of polarization measurement with a satellite mission, specifically for the faint B-mode signal. In this regime, the variation of the spectral properties of the foreground components across the sky is extremely significant, complexifying the problem and requiring novel techniques to counteract. The presentation will feature the ongoing development of the method, along with the current expected performance when applied to the nominal LiteBIRD configuration.

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