

## Beam deconvolution with ArtDeco

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ArtDeco is beam-deconvolution code, designed for absolute CMB measurements.

It has been successfully applied to beam analysis for the LFI instrument of the Planck mission up to multipole  $l_{\text{max}}=1500$ .

Given time-ordered data and known beam shapes as input, the code removes the effects of asymmetric beam shape, yielding as output a map with symmetrized effective beam.

In particular, the method can be used to correct for the beam-induced leakage of temperature signal into polarization. Further developments include applications to power-spectrum estimation. The methodology is based on efficient use of Wigner D-matrices.

We present briefly the algorithmic background, and discuss the computational requirements and the possibility of applying the methodology to future CMB experiments.

As a recent development, we discuss the possibility of combining beam-deconvolution with noise reduction and component separation within a Gibbs sampling framework (BeyondPlanck), and present preliminary simulation results.

### References:

E. Keihänen and M. Reinecke. ArtDeco: a beam-deconvolution code for absolute cosmic microwave background measurements. *Astronomy and Astrophysics*, 548:A110, December 2012

E. Keihänen, K. Kiiveri, H. Kurki-Suonio, and M. Reinecke. Application of beam deconvolution to power spectrum estimation. *MNRAS*, 466:1348, 2017

**Presenter:** Dr KEIHÄNEN, Elina (University of Helsinki)

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