Common-Resolution Convolution Kernels for Space- and Ground-Based Telescopes

Useful to transform between different instrumental PSFs:

- **James Webb Space Telescope (JWST)**
- **Herschel Space Observatory (PACS, SPIRE, PACS Spec)**
- **Spitzer Space Telescope (IRAC, MIPS)**
- **PLANCK space observatory (Gaussian PSFs)**
- **Galaxy Evolution Explorer (GALEX)**
- **Wide-field Infrared Survey Explorer (WISE)**
- **Ground-based optical telescopes (multi- Gaussian and Moffat PSFs)**
- **Gaussian PSFs**

The Kernels:

These kernels are available for use by anyone.

The kernel construction and performance analysis can be found in our paper:
G. Aniano, B. T. Draine, K.D.Gordon, K. Sandstrom, Pub. Ast. Soc. Pac., Vol 123, pp.1218-1236.

We are using the latest available PSF characterization for each instrument.

They have been constructed carefully and subject to a large number of checks, but no guarantee as to their accuracy is given: **use at your own risk**.

Comments and suggestions are appreciated at ganiano@astro.princeton.edu

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Using the Kernels:

I have written a small IDL package (convolve_image.pro) that will load an image file and the corresponding kernel, perform all the necessary steeps, and return the convolved image.
Make sure your image are in surface brightness units.
Several people have tested it with several images and it has always worked successfully, but the possibility of bugs can never be ruled out...
It should display warning messages if something went wrong...
Always inspect the resulting images to make sure it worked properly.

Reference for our work:

If you use these kernels in a paper, please reference:

G. Aniano, B. T. Draine, K.D.Gordon, K. Sandstrom, Pub. Ast. Soc. Pac., Vol 123, pp.1218-1236.

Download the files:

convolve_image.pro

Kernels

History:

- 2011 Apri: First Kernel and IDL routines public release
- 2011 June: WISE camera added and updated PSF characterization
- 2012 July: HERSCHEL Spec added
- 2017 February: PLANCK and JWST Added, WISE camera updated