Contribution ID: **251**   Type: **not specified**

Spatially Variant Point Spread Functions for Bayesian Imaging

Wednesday, 10 July 2024 12:10 (5 minutes)

When measuring photon counts from incoming sky fluxes, observatories imprint nuisance effects on the data that must be accurately removed. Some detector effects can be easily inverted, while others are not trivially invertible such as the point spread function and shot noise. Using information field theory and Bayes' theorem, we infer the posterior mean and uncertainty for the sky flux. This involves the use of prior knowledge encoded in a generative model and a precise and differentiable model of the instrument.

The spatial variability of the point spread functions as part of the instrument description degrades the resolution of the data as the off-axis angle increases. The approximation of the true instrument point spread function by an interpolated and patched convolution provides a fast and accurate representation as part of a numerical instrument model. By incorporating the spatial variability of the point spread function, far off-axis events can be reliably accounted for, thereby increasing the signal-to-noise ratio.

The developed reconstruction method is demonstrated on a series of Chandra X-ray observations of Cassiopeia A.

Presenter: EBERLE, Vincent

Session Classification: FlashTalks