



Astronomy Program Opening Workshop August 22-26, 2016

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“Disentangling Overlapping Astronomical Sources using Spatial, Spectral, and Temporal Information”

In Jones, Kashyap, van Dyk (2015) we present a powerful new algorithm that combines both spatial information (event locations and the point spread function) and spectral information (photon energies) to separate photons from overlapping sources. We use Bayesian statistical methods to simultaneously infer the number of overlapping sources, to probabilistically separate the photons among the sources, and to fit the parameters describing the individual sources. The advantages and utility of combining spatial and spectral information are demonstrated through a simulation study and a data analysis. Since many sources vary in intensity over time, we now aim to additionally model temporal data, that is, the time tags of the detected photons. We discuss the first step towards this goal which is to model spatial and temporal data together and investigate the extent to which the temporal data helps in separating sources. The final aim is to model the spatial, spectral, and temporal data together, taking into account the dependence between the spectral and temporal observations.