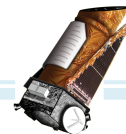




INCREASING THE PRECISION OF THE KEPLER LEGACY ARCHIVE

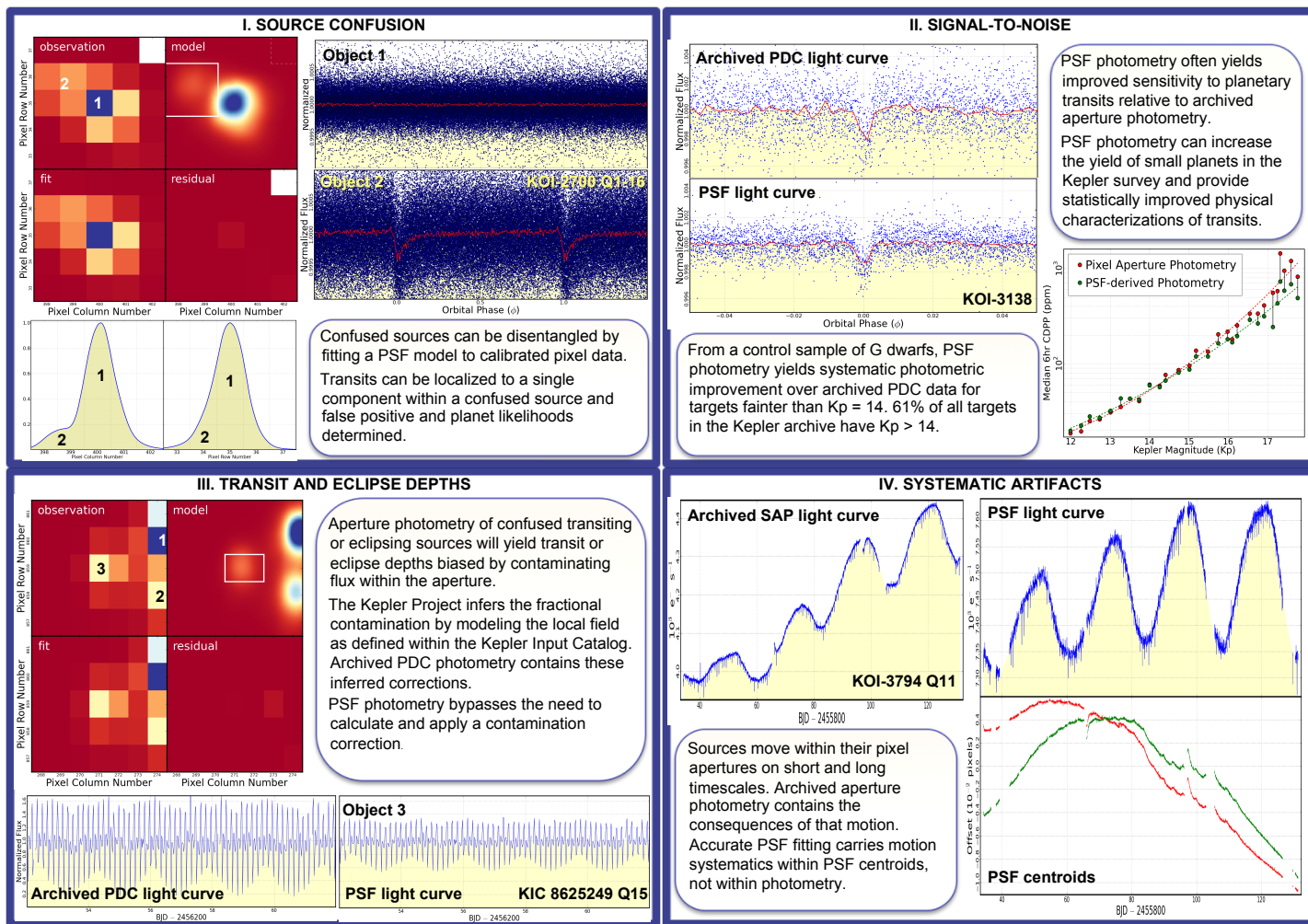
MARTIN STILL^{1,2}

¹NASA Ames Research Center, ²Bay Area Environmental Research Institute



Abstract

We investigate the positive contribution to the Kepler legacy that can be achieved by photometry derived from point-spread function (PSF) fitting to the archived target pixels. We find gains within transit detection and characterization of faint sources, the disentangling of confused sources, the avoidance of contamination and flux-outside-aperture corrections, and the damping of systematic photometric structure resulting from image motion within target pixel apertures. These gains are achieved by using a non-optimal characterization of the PSF that insufficiently captures time-dependent thermal effects upon the PSF profile and fine-detail variation across the field-of-view. While the magnitude of improvement is unquantified, a new PSF calibration, more sensitive to thermal and spatial variation, will most-likely provide an even larger effective improvement upon archive precision and sensitivity.



All software tools are available at keplerscience.arc.nasa.gov/PyKE.shtml. Example data (archive.stsci.edu/kepler/data_search/search.php) and PSF calibrations (archive.stsci.edu/kepler/fpc.html) can be downloaded from the MAST