



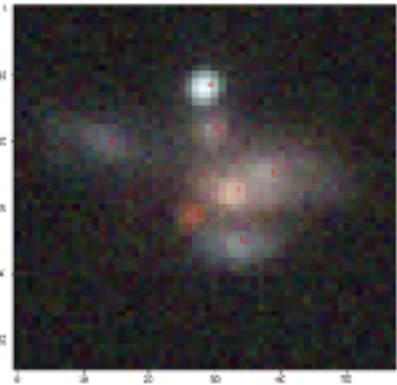
Hands on Deblending : Simulations and Pipeline Tutorial

Fred Moolekamp (Princeton) and
Sowmya Kamath (Stanford)

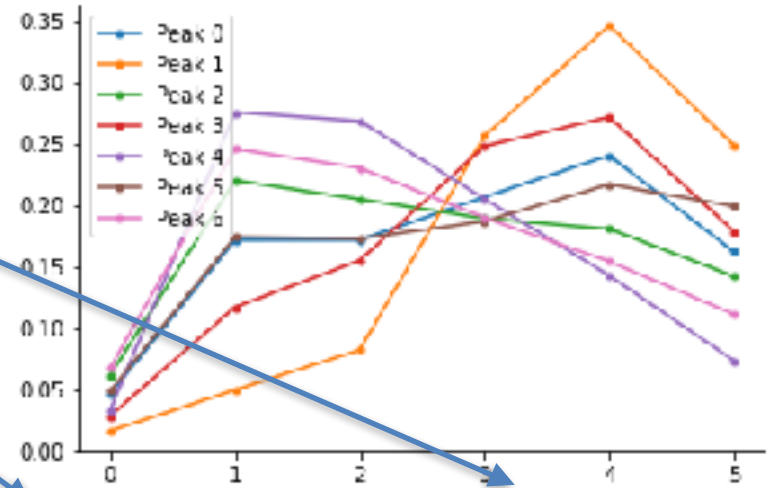
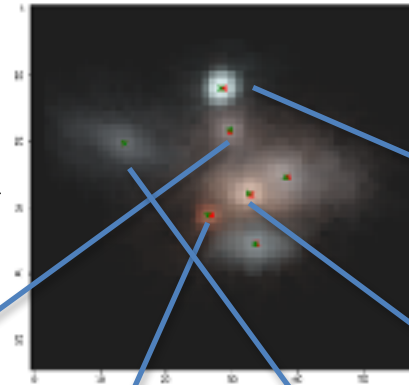
LSST 2018 Deblending workshop
August 14, 2018



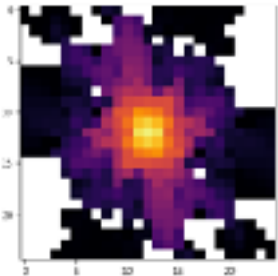
Data



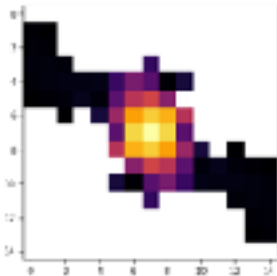
Model



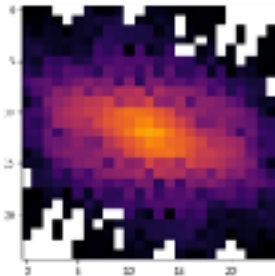
Peak 0



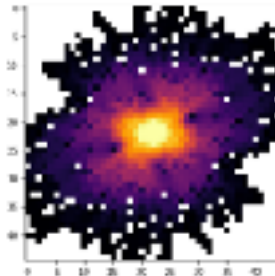
Peak 1



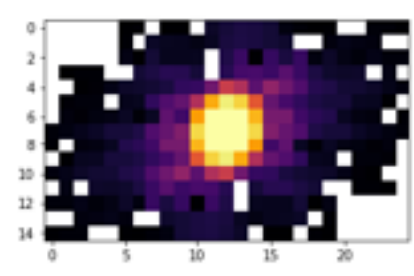
Peak 2



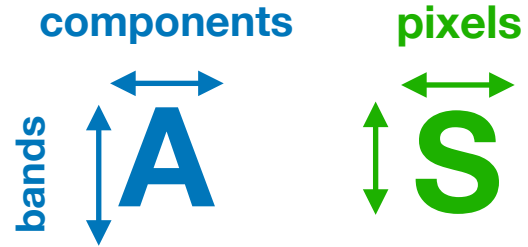
Peak 3



Peak 4



Model for a blend: $M = \sum_{k=1}^K A_k \times S_k$



We want to minimize:

$$f(A, S) = \frac{1}{2} \|Y - AS\|_2^2 + \sum_{i=1}^K \left(g_i^A(A_i) + g_i^S(S_i) \right)$$

Diagram annotations for the equation above:

- A red arrow points from the word "model" to the AS term in the first part of the equation.
- A red arrow points from the word "Data" to the Y term in the first part of the equation.
- Two red arrows point from the word "non-smooth constraints" to the $g_i^A(A_i)$ and $g_i^S(S_i)$ terms in the second part of the equation.

Use gradient decent and proximal operators to solve

- If you do not yet have an LSST identity, sign up for one at: <https://identity.lsst.org/join/4VYAMGK2E3>
- In your browser go to <https://lsst-lspdev.ncsa.illinois.edu/nb>
- Choose the latest weekly LSST stack: `w_2018_32`
- Open a terminal and type the following commands:

```
~$ source /opt/lsst/software/stack/loadLSST.bash
~$ setup lsst_distrib
~$ cp /project/fred3m/tutorials/lsst2018/notebooks/*.ipynb .
```
- Open the scarlet_tutorial.ipynb notebook to begin (you might have to refresh your files)