An iterative approach to difference imaging

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The fundamental difference imaging equation is

$$\left(R \otimes K\right)_{ij} - T_{ij} = D_{ij}$$

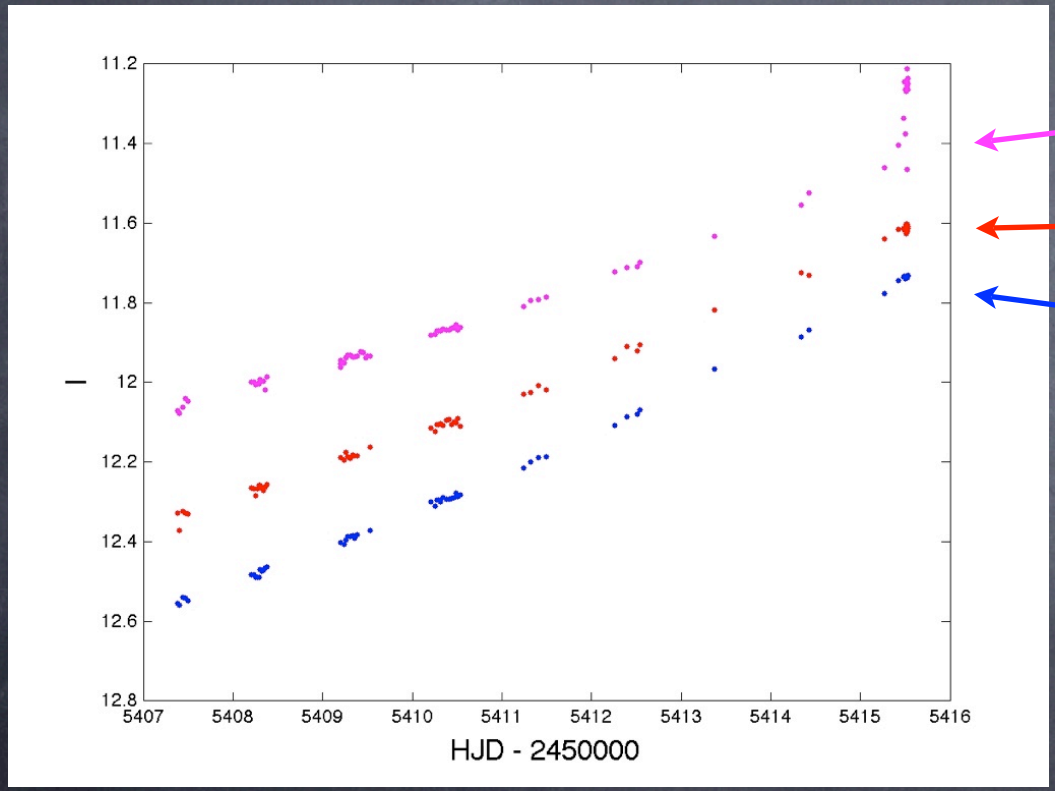
The kernel, K, is usually decomposed into a sum of fixed-width Gaussians (ISIS) or a numerical pixel array (DANDIA, pySIS3), and is computed to minimise

$$\chi^2 = \sum_{ij} \frac{\left[\left(R \otimes K\right)_{ij} - T_{ij}\right]^2}{\sigma_{ij}^2}$$

The quality of the difference imaging is only as good as the quality of R. We can improve R by minimising

$$\chi^2 = \sum_{\alpha}^{images} \sum_{ij} \frac{\left[\left(R \otimes K_{\alpha}\right)_{ij} - T_{\alpha ij}\right]^2}{\sigma_{\alpha ij}^2}$$

SAAO data for MOA-2010-273



PLANET realtime pipeline (ISIS)

pySIS3 rereduction

new method