PS1 Stack objects and photometry

The following information is taken from Magnier et al., which should be cited appropriately.

The stack images are generated in the Stack stage of the PS1 IPP pipeline, but the source detection and extraction analysis of those images is deferred until a separate stage, the **STACK PHOTOMETRY** stage. This separation is maintained because the stack photometry analysis is performed on all 5 filter stack images at the same time. By deferring the analysis, the processing system may decouple the generation of the pixels from the source detection. This makes the sequencing of analysis somewhat easier and less subject to blocks due to a failure in the stacking analysis.

The stack photometry algorithms are described in detail in **Magnier et al**. In short, sources are detected in all 5 filter images down to the 5 significance. The collection of detected sources is merged into a single master list. If a source is detected in at least two bands, or only in y-band, then a PSF model is fitted to the pixels of the other bands in which the source was not detected. This forced photometry results in lower significance measurements of the flux at the positions of objects which are thought to be real sources, by virtue of triggering a detection in at least two bands. The relaxed limit for y-band is included to allow for searches of y-dropout objects: it is known that faint, high-redshift quasars may be detected in y -band only. The casual user of the PV3 data set should be wary of sources detected only in y-band as these are likely to have a higher false-positive rate than the other stack sources.

For each source in the stacks, many different properties are measured via several different procedures; the information is organized into Tables, described in detail below. Useful photometric measurements include: Aperture Photometry, PSF photometry, Kron photometry (especially relevant for non-point-sources), and Forced Photometry. For sufficiently bright extended sources, the light distribution is fitted with de Vaucouleurs and Sersic models, with the parameters reported in the linked tables.