The **WFAU** Matched-Aperture Photometry Pipeline

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The Wide Field Astronomy Unit (WFAU) archives optical/near-infrared imaging data for UKIRT-WFCAM, in the WFCAM Science Archive (WSA), VISTA in the VSA and VST-OmegaCAM in the OSA. This poster summarises enhancements to the WFAU data reduction pipeline to include various matched-aperture photometry options that are needed by these surveys.

Current Requirements:

VIKING-KiDS-GAMA consortium: Combined VIKING-KiDS 9-band photometry for photo-z catalogues and 4MOST-WAVES target selection. Use LAMBDAR and GaAP for photometry.

VIKING high-z QSO community: J-band forced photometry of pointings with Z and Y images to find z>8 QSOs candidates, for Hawk-I deep Z and Y follow-up observations, see (Fig 1).

UKIDSS-DXS & PanSTARRS: matched aperture photometry, for photo-zs. Use SExtractor / LAMBDAR.

VMC: improved light-curves in crowded regions where deblending varies from epoch to epoch due to seeing variations. Use imcore_list.

Fig 1: Selection of candidate z>8 QSOs in VIKING (J>20, (Y-J)>2., (Z-Y)>4.). Bottom plot shows independent photometry, and top plot shows matched-aperture photometry. Potential QSOs are shown in green.

Details of software used in Matched Aperture Pipeline :

- Flexible Requirements table that allows setup of:
  - Inputs from master image, SQL selection, file of coordinates
  - Photometry package (imcore_list, Sextractor, LAMBDAR, GaAP)
  - One or more surveys to remeasure in
  - Type of final product – multi-band / multi-epoch
  - Schema files derived from template and requirements
- Mosaicing pipeline to process images for low-z extended sources:
  - SWARP to put onto same image scale
  - Uses GaAP for Gaussianisation.
- Photometry done on pawprint images for improved accuracy.
- Modifications to existing catalogue processing code for:
  - Low/negative fluxes: Luptitudes/calibrated fluxes (Jansky)
  - Multiple Extractors
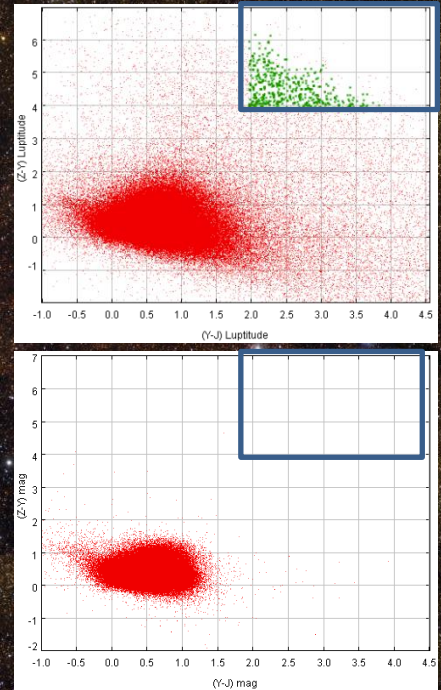- Averaging pawprints measurements over tile/mosaic for better S/N.

Related Papers:
Bertin & Arnouts, 1996, A&AS, 117, 393
Cross et al. 2014, ASPC, 485, 371
Cross et al. 2012, A&A,
Hambly et al. 2008, MNRAS, 384, 637
Irwin et al. 2004, SPIE, 5493, 411
Kuikjen et al. 2008, A&A, 482, 1053
Wright et al. 2016, MNRAS, 460, 765

Take home message: 1st releases for good point-source photometry now available to teams. Extended source / multi-survey coming soon!