ULTRASAT WG12

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Outline

- Goals
- Feedback is needed(!):
  - Data archive
  - Data products
- Status and missing components
- Calibration

Data Availability/Archive

- No plan
- Guidelines:
  - Easy to use
  - Science ready (minimize time to do science)
  - Binary files
- Access options
  - Flat directories
  - Web GUI access
  - API
  - Visual access
  - Simple DB queries
  - Advance DB queries
  - Light/position curves

Data Products: Level 0

- See some outlines and tests in Ofek+2023
- Raw images
  - 4 images (detectors) per epoch
  - Calibration images: flat + darks (?)

Data Products: Level 1

- Proc images
  - ~ 256 x 256 pix sub images (not final)
  - ~1300 sub images per epoch
  - Mask images (32 bits)
  - Background image
  - Variance image
  - PSF (~5 per sub image)
  - Source catalog
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Data Products: Level 1.5

- Proc visit images (coaddition of images)
  - Coadd sub images (3, 30, 288 epochs)
  - Mask images (32 bits)
  - Background image
  - Variance image
  - PSF (~5 per sub image)
  - Source catalog
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Data Products: Level 2

- Subtraction images
  - Proper sub. Image (D) + under sampled analog (Barak's talk)
  - Proper sub. PSF (PD) (~5 per image)
  - Subtraction stat (S, Scorr)
  - Traslient (Z2)
  - Mask images (32 bits)
  - Background image
  - Variance image
  - Transients catalog
- Relational DB
- Light Curves
- Asteroids matching
- Asteroids search

Pipeline Status

- Work started ~2020
- Strategy: rewrite code from scratch
  - Why? Efficiency & spatial needs
  - Reprocessing + LAST
- ~120,000 lines of code
- Most components are ready
- Many are missing(!)
- Large part of the pipeline is operational and being tested (LAST, PTF Ha, TESS,...)
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Challenges & missing code I

- DB injection+search optimization / not done
- Subtraction code source detection layer / started
- Tranlient tests / started
- PSF management / started
- PSF estimation for undersampled images / not started
- PSF photometry (improvements) / started
- Astrometry improvements / investigated
- Photometric calibration (new approach) / started

Challenges & missing algorithms II

- Under sampled images (Barak+Matan talk)
  - Coaddition
  - Subtraction
  - Being tested but no rotation treatment yet!
  - We have a backup plan
- Ghosts detection
- Cosmic rays treatment

Challenges & calibrations III

- How to monitor the dark current rate?
- How to monitor the flat? Likely with stars
- Calibration:
  - ULTRASAT transmission is variable
  - We want to provide flux + transmission

end