

OSIRIS Hackathon

May 4-6, 2016

Wednesday Schedule

9:30 am - 10 am - Goals and organization

10 am - 11:30 am - Breakout groups discuss plans

- C-code debugging/coding
 - Greg, Shelley, James, Anna, Jim
- Running Tests/diagnostics
 - Kelly, Breann, Sam, Devin, Andrey
- Building testing framework
 - Alex, Tuan, Jessica

11:30 am - 12 pm - Report on group plans / feedback

12 PM - Lunch

1 pm - 2:30 pm - Breakout group working time

2:30 pm - 3 pm - Coffee break

3 pm - 4:30 pm - Breakout group working time

4:30 pm - 5 pm - Report on progress

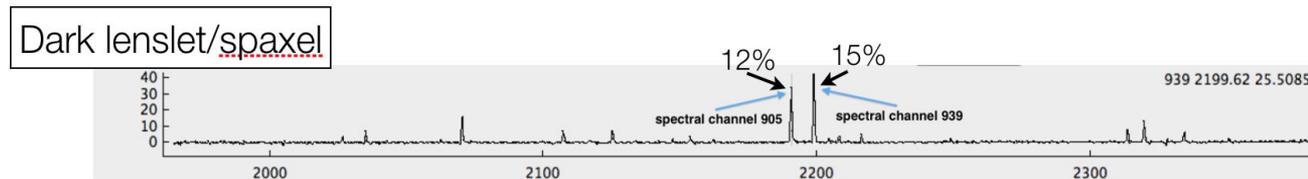
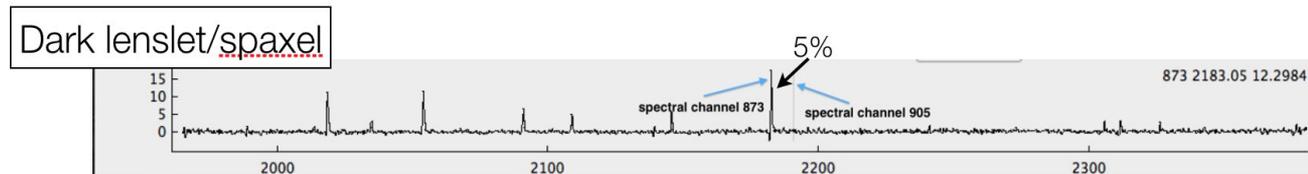
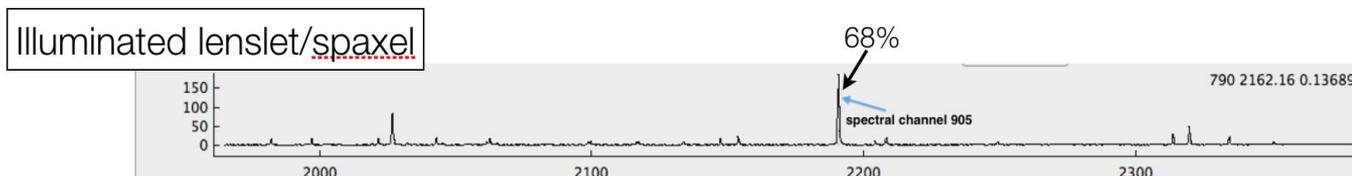
6 pm - group dinner at BJ's in Westwood

Flux allocation issue

- Flux is being redistributed +/- 32 channels away
- Questions:
 - What is the strength of this effect? Seems to be very strong in arclamps, hard to see in skies.
 - What scales does this affect?
 - Why is there flux at the right wavelength in the wrong spaxel (single column illuminated arcs)
 - Check for centring of mask.
 - Measure the amount of mis-assigned flux vs. mode, strength of line, cal/sci (OH lines vs. arclamp), wavelength
- Play with deconvolution algorithms on a single column

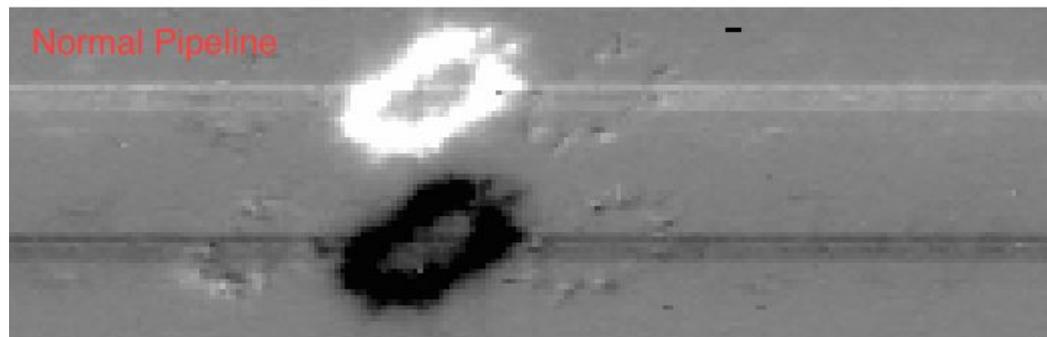
Spectral flux misassignment

arc lamps, one lenslet column illuminated

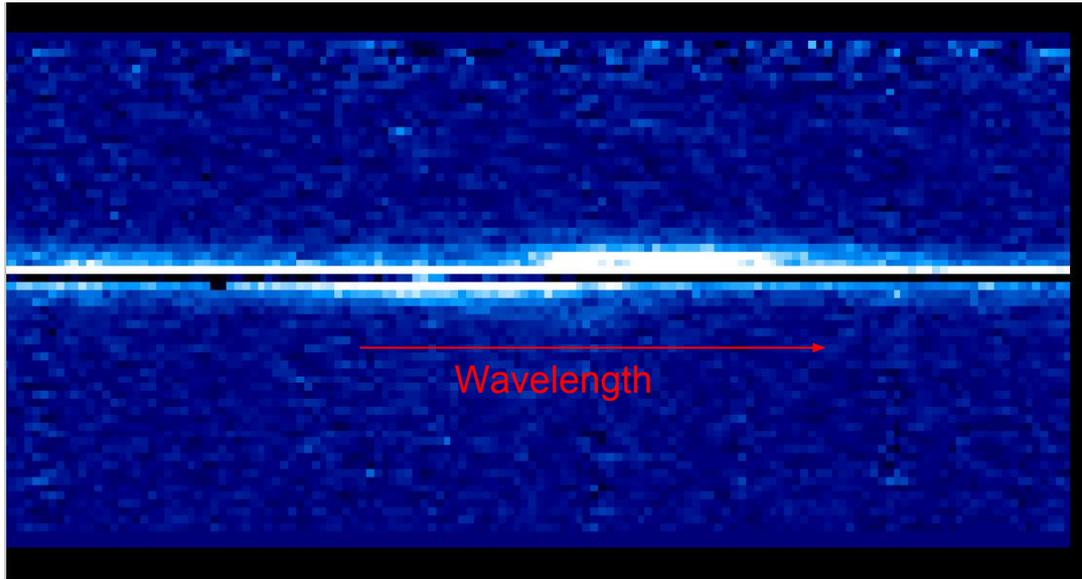


X-direction: wavelength

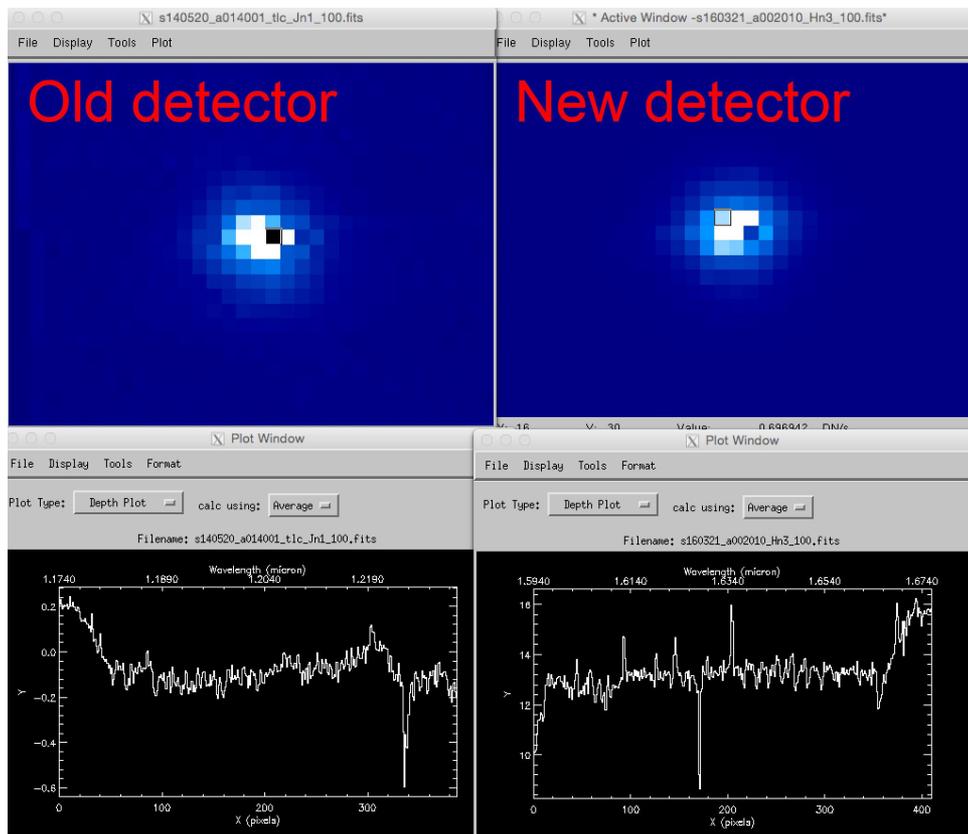
Y-direction: spatial



Spatial flux misassignment



Spatial flux misassignment



Fringing

- We know we can reduce/remove it with smoothing... are there alternatives?
- How big is the effect on new skies?
- If we smooth
 - What are the best algorithms
- Claim:
 - If you integrate over the lines, you shouldn't see the fringing/Moire patterns.
 - Factor of 3 less in the integral... but still seeing it.
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Other Topics

- Background subtraction (ESO skycorr?)
- Repository Infrastructure
- Installation Notes/Issues
- Smoothing to common spectral resolution?
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Agenda, Thursday May 5, 2016

9:30 am - 10 am - Update on new detector and data performance (James)

10 am - 10:30 am - Pipeline changes for new data / changes to be done

10:30 am - 11:30 am - Breakout groups

11:30 am - 12 pm - report on progress and afternoon tasks

12 pm - 1 pm - lunch

1 pm - 2:30 pm - Breakout groups

2:30 pm - 3 pm - Break

3 pm - 4:30 pm - Breakout groups

4:30 pm - 5 pm - Report on progress / Friday plans

Things we need to test/more information

- PSF differences between Cal and On-sky for all four plate scales
 - Percentage residual
 - Currently prioritize same filter w/ all four plate scales
 - Dec 9, 2015 Arc data: Jbb, 50 mas (Dec 9), Hbb, 50 mas, Kn3, 50 mas, Kbb, 20 mas, Kbb, 35 mas, Kbb 50 mas, Kbb, 100 mas, Kcb, 100 mas, Kn3 35 mas
 - Sky Data we want: Kbb 20 mas (GC), 35 mas (GC), 50 mas (Anna, Kelly), 100 mas (Alex)
 - We need to get white light scans for Kbb 20, 35, 50, 100
- Reduce white light data with white light scan (same scan that made the matrix)
 - Old data vs. new data

Thursday Summary: Pipeline Infrastructure

- Installation
 - Easier to compile (run 'make all' in root directory)
 - Can run from bash now
 - More instructions
- Code Organization
 - Includes IDL astrolib through git subtree
- Testing Framework
 - Tests directory
 - Easy to make tests: put test xml file and py test compatible format test into a directory, then put necessary data online
 - Test framework will download all necessary files (and rectification matrices if necessary).

PSF tests

Kbb 50 Psfs

FWHM scans (May 2015) > arcs (Oct 2015) < skies (May 2015)

Kbb 50 mas Scans > sky

Agenda, Friday May 6, 2016

9:30 am - 10 am - Plans from each group

10 am - 10:30 am - UCO White Paper discussion

10:30 am - 11:30 am - Breakout groups

11:30 am - 12 pm - report on progress and afternoon tasks

12 pm - 1 pm - lunch

1 pm - 2:30 pm - Breakout groups

2:30 pm - 3 pm - Break

3 pm - 4:00 pm - Summary / Write-up

4:00 pm - 5 pm

Summary Discussion

Flux misassignment

- Flux misassignment is a 20-30% effect on a single emission line from arc lamps on old detector (Kbb 50 mas). 8-20% on new detector (Jbb 50 mas). Likely varies by mode and filters
- Simplified basic extraction code without affecting resulting cubes
 - Removed smoothing
 - How to apply blame in each iteration. Tried different algorithms.
- We learned that it is likely not the algorithm, but rather the PSF
 - Calibration arc lamps appear to have different shape than skylines?
 - Is there an issue with the light source?
 - 2D PSFs are asymmetric. Hard to quantify. Currently assume 1D PSFs for deconvolution
 - PSFs are clipped in extraction of white light scans for rectification matrices. Testing the size of PSF clipping and weight limit: improvement in white light extraction with self-PSF (6% now compared to 10% before)
 - Tried to blur and sharpen rectification matrices in spatial direction - no significant effects

● Goals:

Summary Discussion

Spatial ripples

- Seems worse with new detector (sharper images lead to worse sampling)

Goals

- What is the best way to deal with spatial ripples on emission lines?
- Test some sampling effects spatially, and spectrally
- Build pipeline module to smooth to the same spectral resolution across detector

Summary Discussion

Tests and data

- Tests built:
 - Flux misassignment quantification with emission lines in reduced cube
 - PSF shape & flux quantification (initial)
 - Tests for flux conservation on stars at different spaxels
- Data sets gathered and compiled XML reductions
 - Skies at Kbb for 20, 35, 50, 100 mas
 - Skies for new detector (Kbb 35, Jn2 35, Jbb 50, Hbb 50)
 - Arcs (2015 [Kbb+Jbb, 020/035/050/100] + 2016 [Jbb 050])
 - White light scan - 1 single column white light (Kbb 050)
 - Science data tests: QSO (new+old), nova
- Goals:
 - Put together a set of calibration data to test

Summary Discussion

Testing framework and code infrastructure

- Using github for development and community input into pipeline
- Maybe use github for distribution of new pipeline
- Code now supports standard way of making and running tests
- Testing data repository (pipeline will auto download tests on request)
- Simplified installation (documentation, bugs fixed, etc.)

Goals

- Release pipeline to work with new data (what extraction code should be in it?)
- Make more tests in testing framework

Other points for UCOAC

- Upcoming white paper being submitted
- KOA is not keeping enough scan data (should keep medians that are actually used to make rectification). Needs to make calibration files easier to download and find
- DRP support from Keck