STIS Update

John Debes & Tala Monroe
for the STIS Team
STUC 12 November 2019

Recently Completed Work

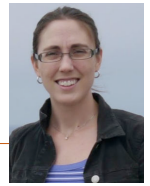
Documentation:

- ISR 2019-01: A New Method to Monitor the HST/STIS Focus
- ISR 2019-02: Identifying Jitter Induced CCD CR-SPLIT Combination Errors
- ISR 2019-03 (x-post from JATIS): Pushing the Limits of the Coronagraphic Occulters on STIS
- Migration of IHB to HDox, Data Handbook next

Instrument Support:

- Delivery of new NUV dark reference files (see last STUC presentation)
- New UV Time Dependent Sensitivity reference files (1-4% improvements)
- Jitter impacts to coronagraphy (ISR in review)
- Updates to enclosed energy curves in first order modes for ETC (See ISR 2018-06)

Updates to the TDS-Reference files delivered!



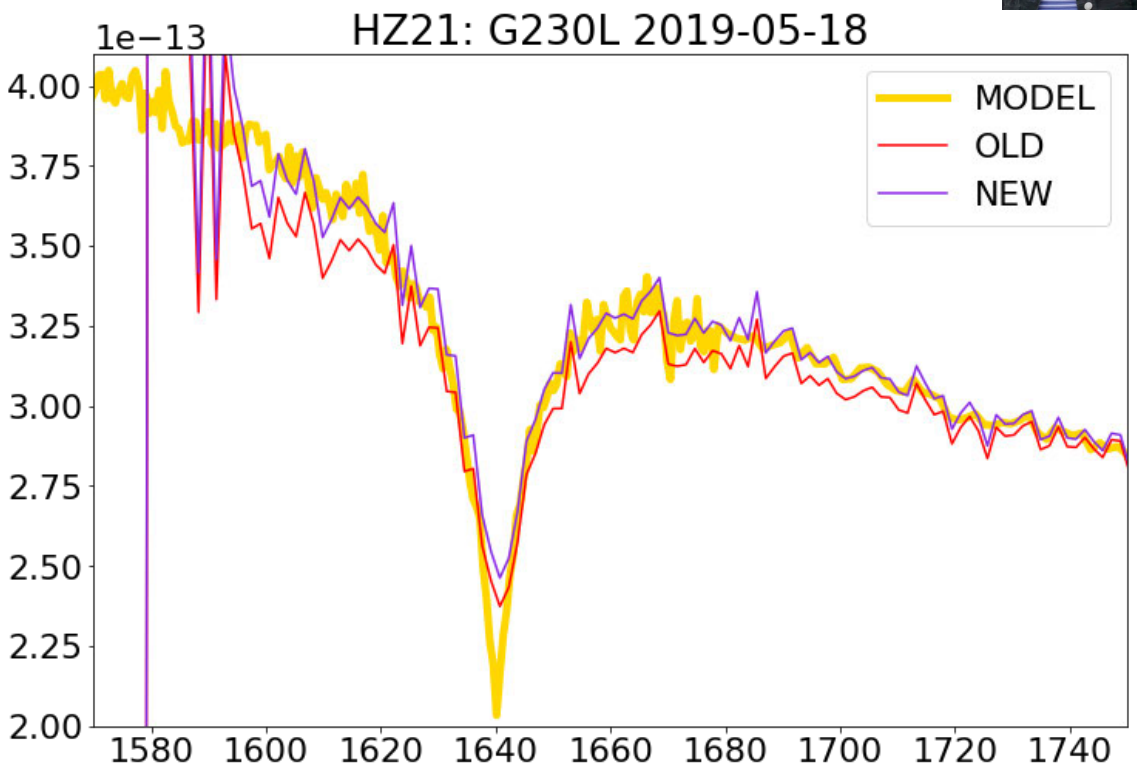
NUV-MAMA departing from spec: 2-4% improvements

NUV/CCD: <1% improvements

CCD: <1% improvements

FUV-MAMA: 2% improvements

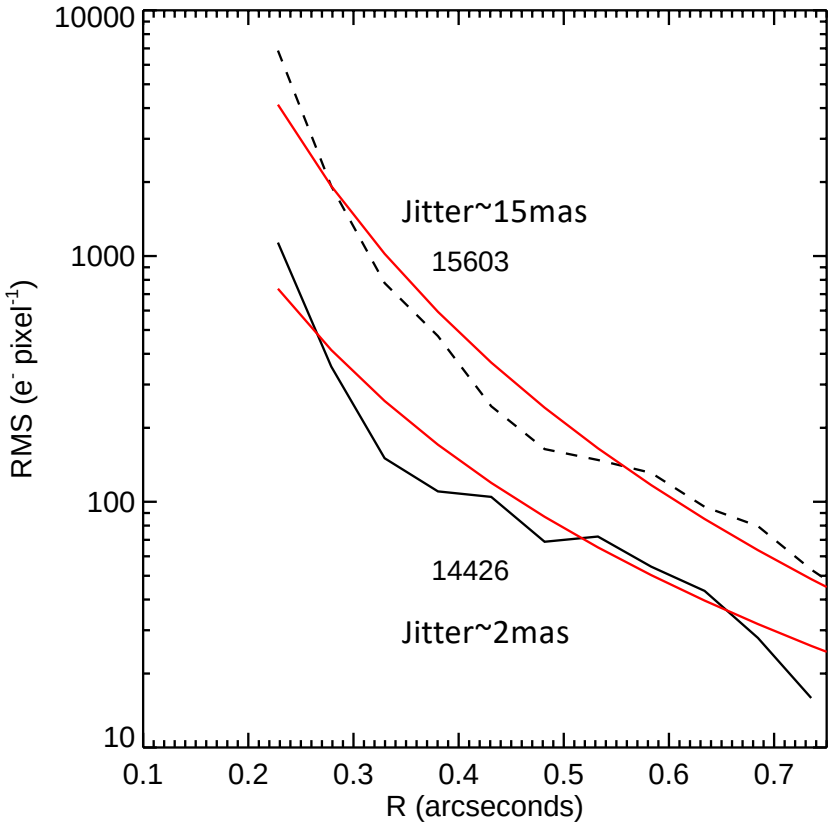
Also reflects updates to TDS monitoring code to decrease systematics



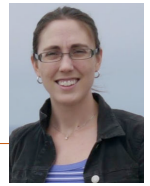
The impact of Jitter on Coronagraphy

Monitoring Contrast vs. Jitter

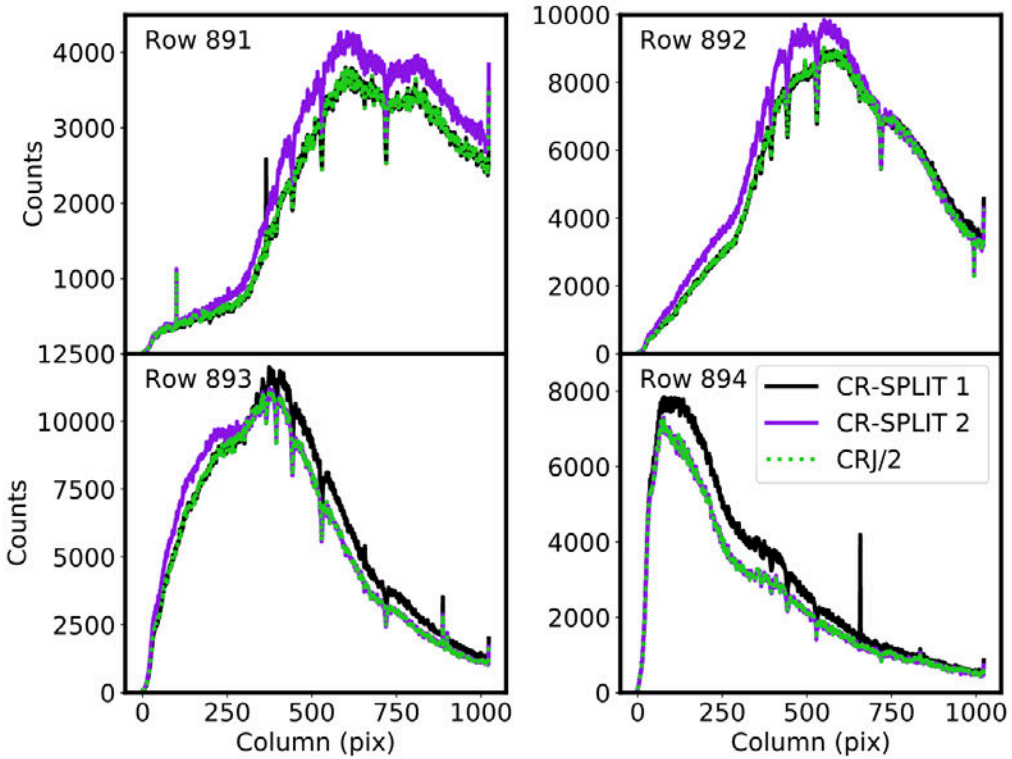
- FGS, WFC3 ePSF fitting, and Corongraphic centroiding all result in consistent measures of jitter
- Gyro 2-4-6 combination in 2018 increased jitter and degraded contrast
- ISR is under review
- Future work: track impact to contrast across full range of jitter values



Determining the impact of Jitter on combining CR-SPLIT Spectra



- Jitter >7 mas can cause CR rejection algorithm to fail
- Users need a way to tell if this has happened
  - Look at jitter files
  - Use new *stistools* package *crrej_exam*
- ISR published



Future Work in FY20

- Rapid completion of instrument reviews to aid in scheduling
- Complete E140M flux recalibration
- Complete investigation of spatial scanning for transiting exoplanet science
- Complete Fringe Flat Tool—to create a more user friendly tool in Python, and study the utility of a generic fringe correction
    - Coding sprint was delayed until late FY19, sprint completed and code being finalized for verification and testing
- Echelle Dispersion Monitor Revamp—assess need for legacy wavelength dispersion solutions+leverage against external calibration program by PI Ayres (Program 15948)
- Push absolute flux calibration of first order modes towards 1%

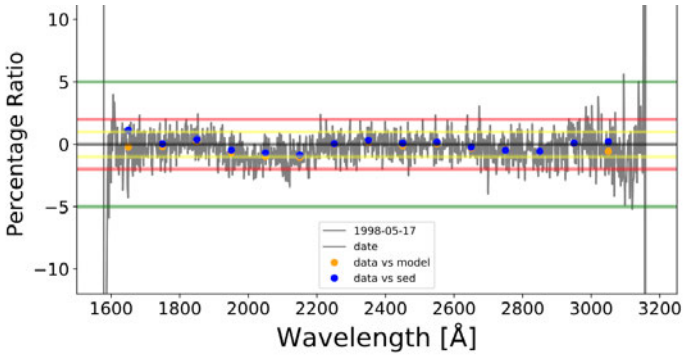
Cycle 27 Calibration Program Relevant to the Community

Special Programs

16028: Absolute Flux Calibration of STIS FUV-MAMA G140L and NUV-MAMA G230L

- Attempt to track down sub-requirement systematics in first order UV gratings with goal of flux calibrations approaching <1% across the history of STIS

1998 May



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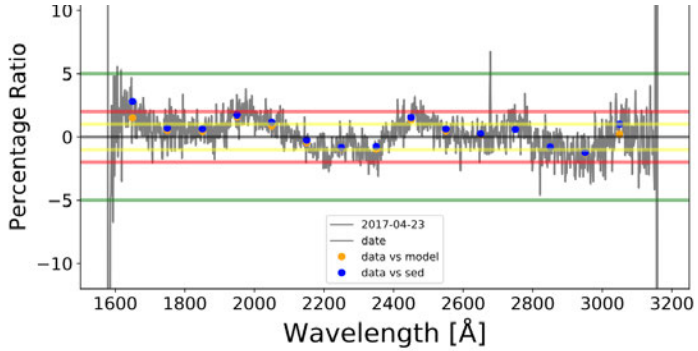

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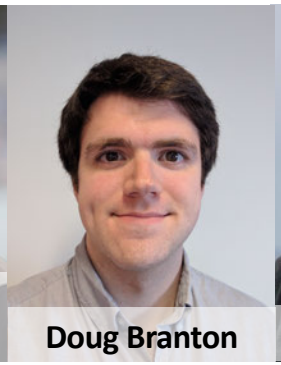
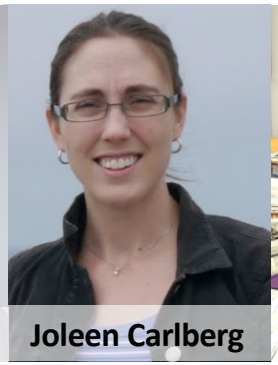
Backup Slides

The STIS Team

John Debes
Lead


Doug Branton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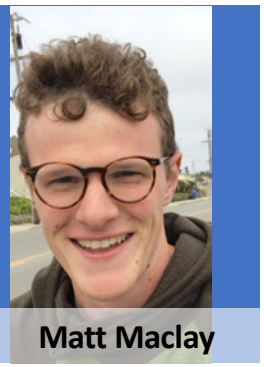
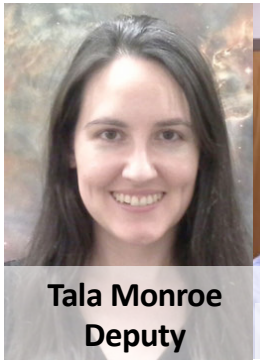
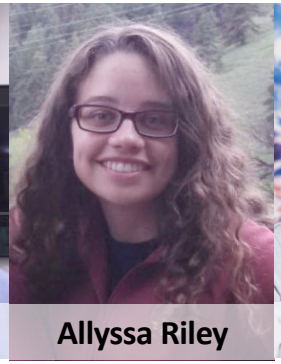

Matt Maclay


Tala Monroe
Deputy

Charles Proffitt


Allyssa Riley

Tony Sohn

Dan Welty

Special Calibration Program 16028 Rationale

Obtain high SNR spectra for primary calibrators of STIS/COS

This will:

- Improve the CALSPEC SEDs of WD 0308 (all gratings), WD 1057 (adds G750L), and WD 1657
- Improve WD modeling
- Reduce the absolute flux uncertainty from ~5% (e.g. G140L/G230L overlap) to 1-2%
- improve precision of time-dependent sensitivity

Why 3 WDs?

- provides calibration cross-checks in the critical FUV and NUV range