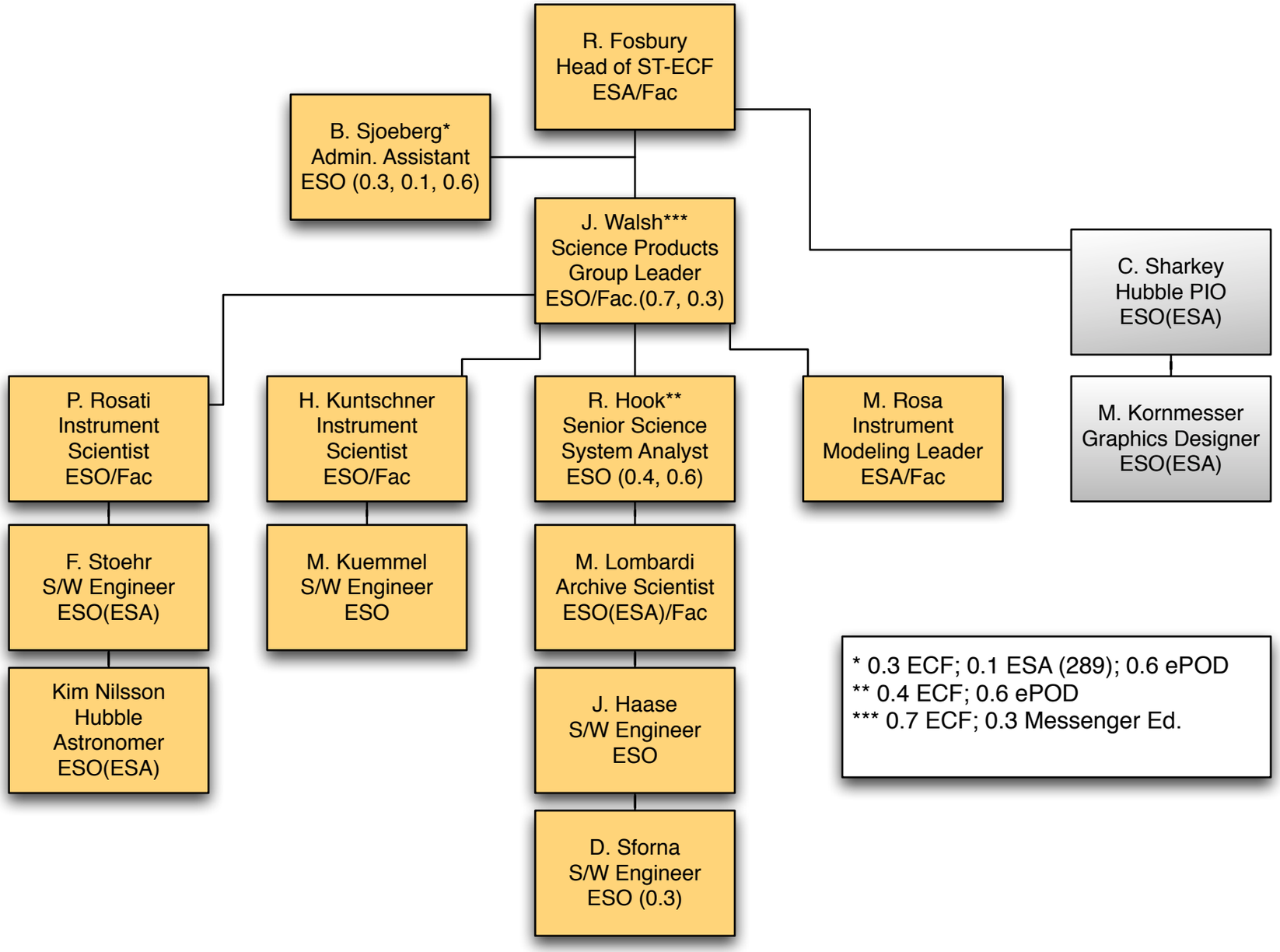
ST-ECF

Bob Fosbury

ST-ECF Organigram
2010, March



ST-ECF tasks

- Hubble project
  - Slitless spectroscopy support (NICMOS, ACS, WFC3): simulator, calibration, extraction s/w, user support, science
  - European HST archive operation
  - Hubble Legacy Archive: high-level data products in collaboration with STScI and CADC
  - PSF modelling (TinyTim for WFC3)
- ESO collaborations
  - Instrument reviews and science teams; Archive; GOODS; Messenger; ePOD…
- ESA ‘Cosmic Vision’ programme support
  - Advice and simulations for EUCLID mission (Yellow Book)

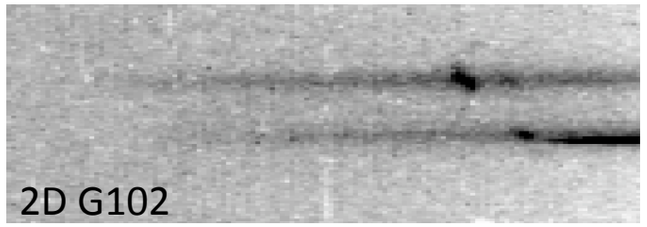
- European public outreach (by ePOD)
  - News/photo releases
  - Hubblecasts
  - Prepare for post-2010 activity for ESA
- Science with HST - III: Two Decades and Counting
  - High-profile conference in Venice, NASA/ESA support, October 11–14, 2010
  - Month-long Exhibition (also Venice)
    - 15 Sep – 15 Oct
    - HST h/w and images

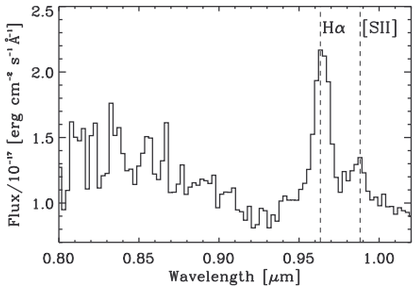
Highlight WFC3 prep. 1/2 FTE

Installed 14 May 2009
Andrew Feustel

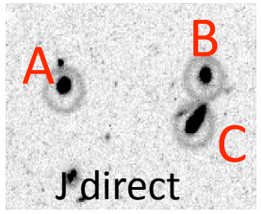
- Ground calibration support
- SMOV support: on-orbit calibration
- User support

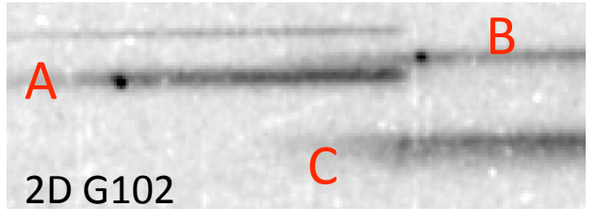
- WFC3 IR grism spectra
- Courtesy the WISP collaboration (Cy 17 parallel programme)

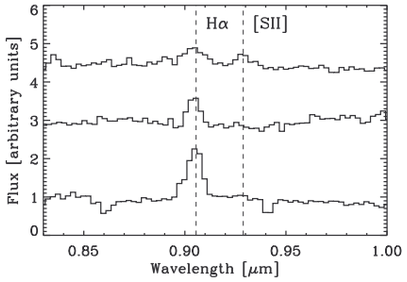




Pair of galaxies identified at z=0.45. The tidal tail and disturbed morphology observed in the J image show the interacting nature of these objects.

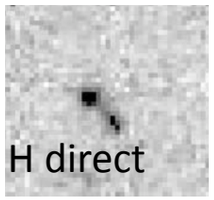


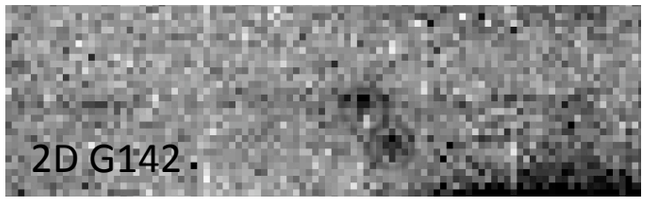


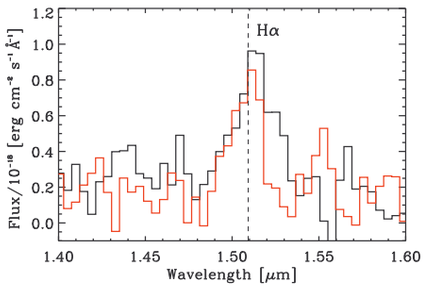


Group of galaxies identified at z=0.37. Although our sensitivity for emission lines is maximized for compact sources (e.g., galaxy B for which we also detect [SII]), we detected Ha also in the more extended ($R_{1/2}$=0.8") galaxy C.

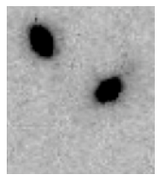
Example of a faint (H=22.5) star forming galaxy at z=1.45 galaxy for which we detect [OII] in the G102 (blue spectrum), and Hb, [OIII], Ha in the G142 (black spectrum).

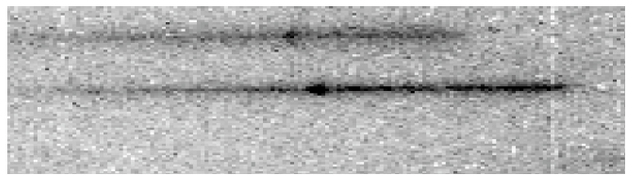


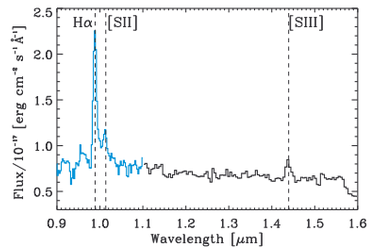




Example of high EW (EW_{Ha}=200A) star forming galaxy pair at z=1.5.





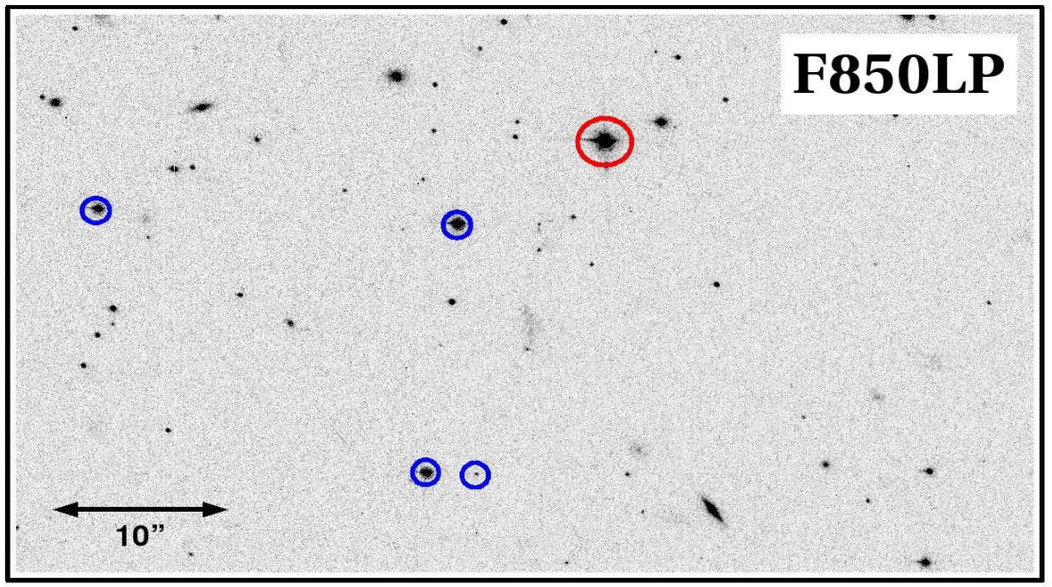


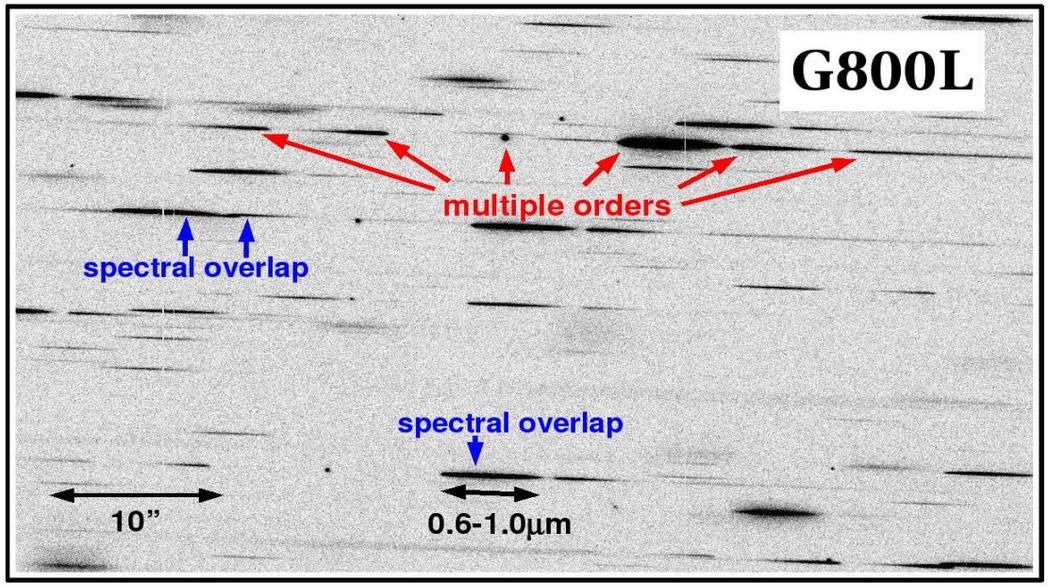
Example of galaxy at z=0.51 showing Ha, [SII] and [SIII]

13 April 2010

Highlights HLA ~ 4FTE

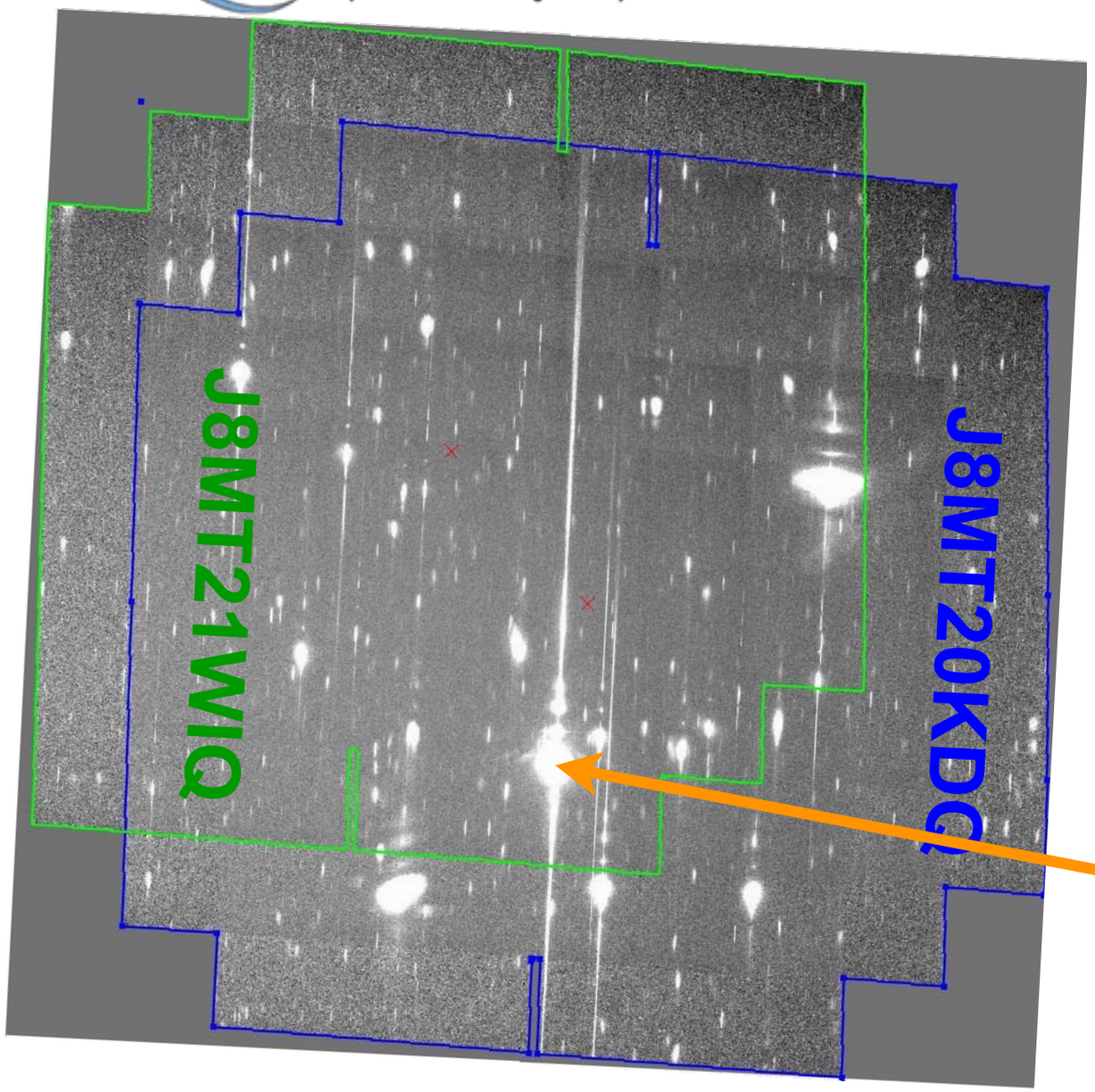
- ACS/WFC G800L data
  - Wavelength range: 0.6–1.0μm
  - Resolving power ~100
  - Archive contains ~150 data sets
  - Sky coverage: ~ 600 arcmin^2
  - Yields ~ 30,000 spectra
  - many data sets close to each other
  - exposure time: several ksec
  - often/usually parallel data
- Major effort on quality control
  - Contamination
  - Astrometry
  - Photometry

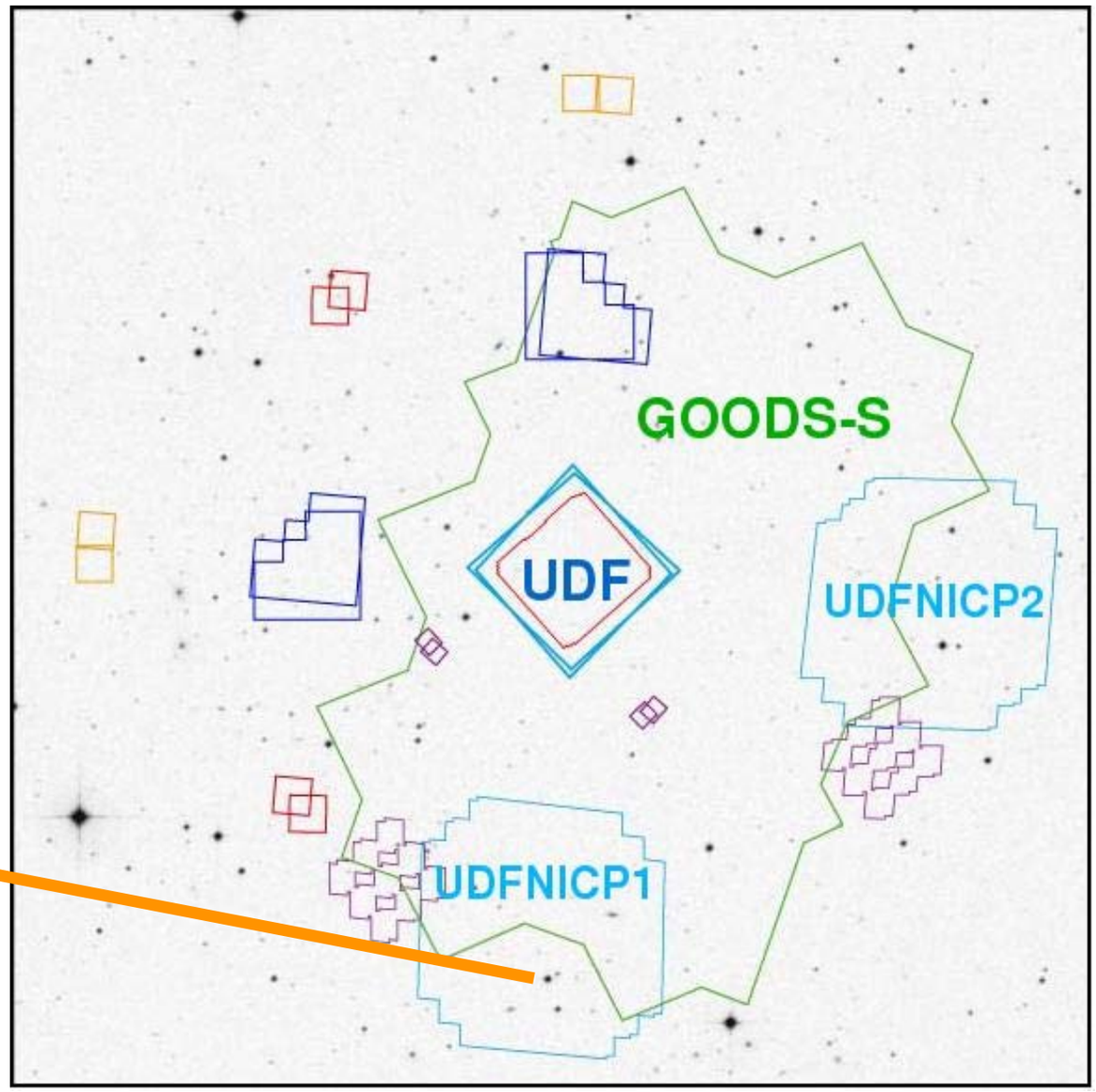




Slitless image and the corresponding **direct image**

Full release (Apr 10) including UDF NICMOS parallels





G800L - up to 18 ksec

-> a few ten-thousand spectra for all “associations”

Examples

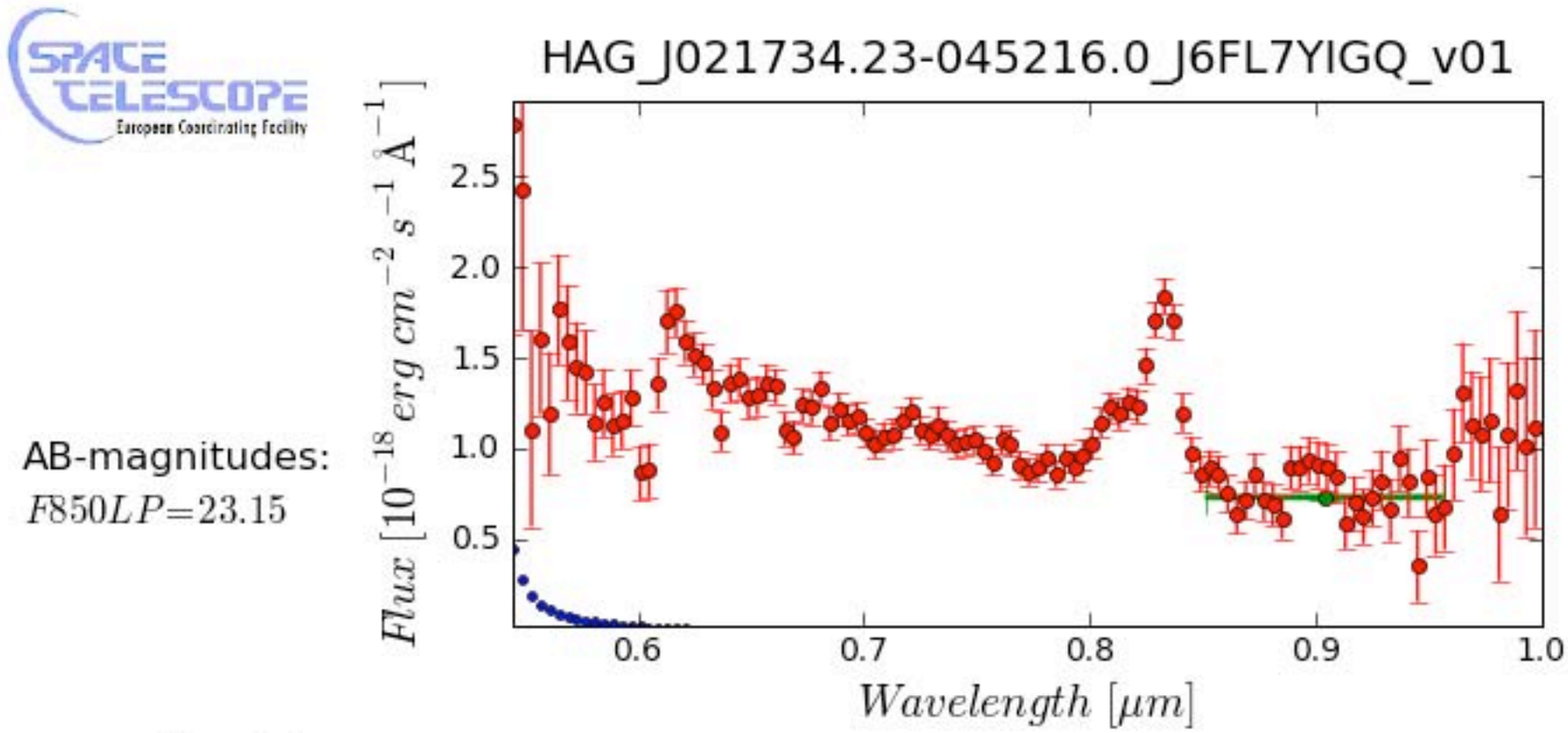
Note the comparison with imaging photometry (green)

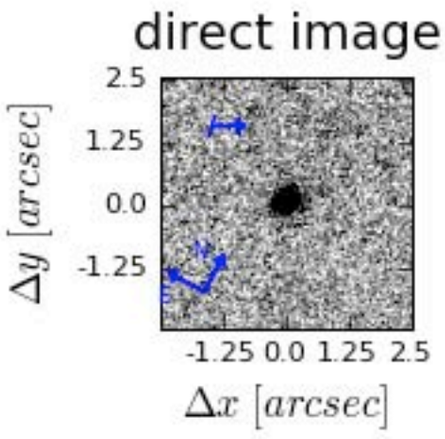
The extraction aperture

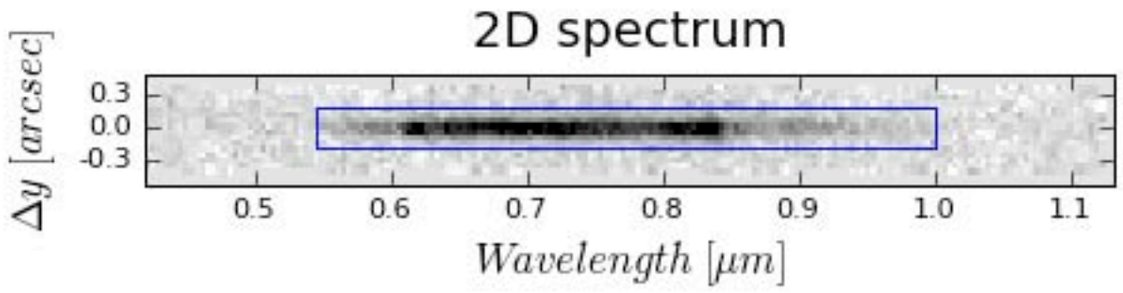
Object and ‘slit’ orientation

Error bars

Contamination indicator

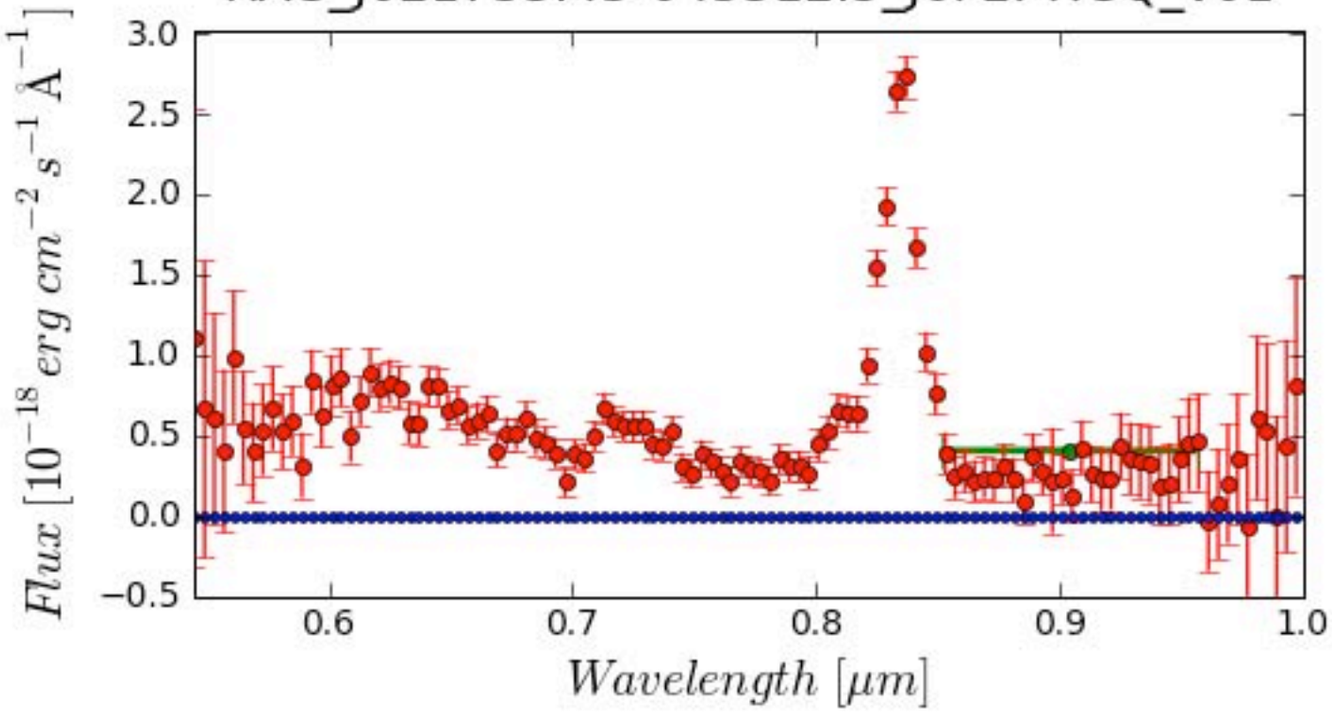


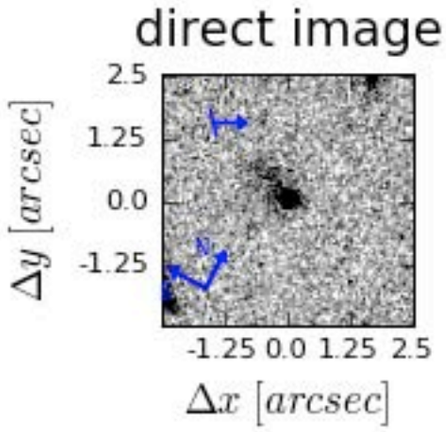


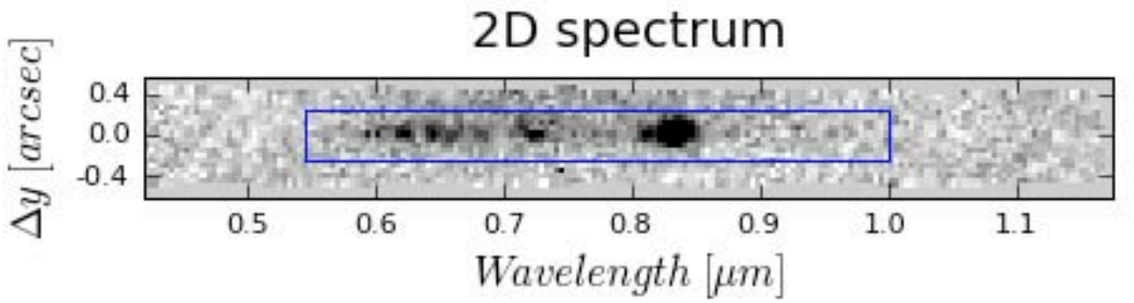


AB-magnitudes:

$F850LP = 23.79$

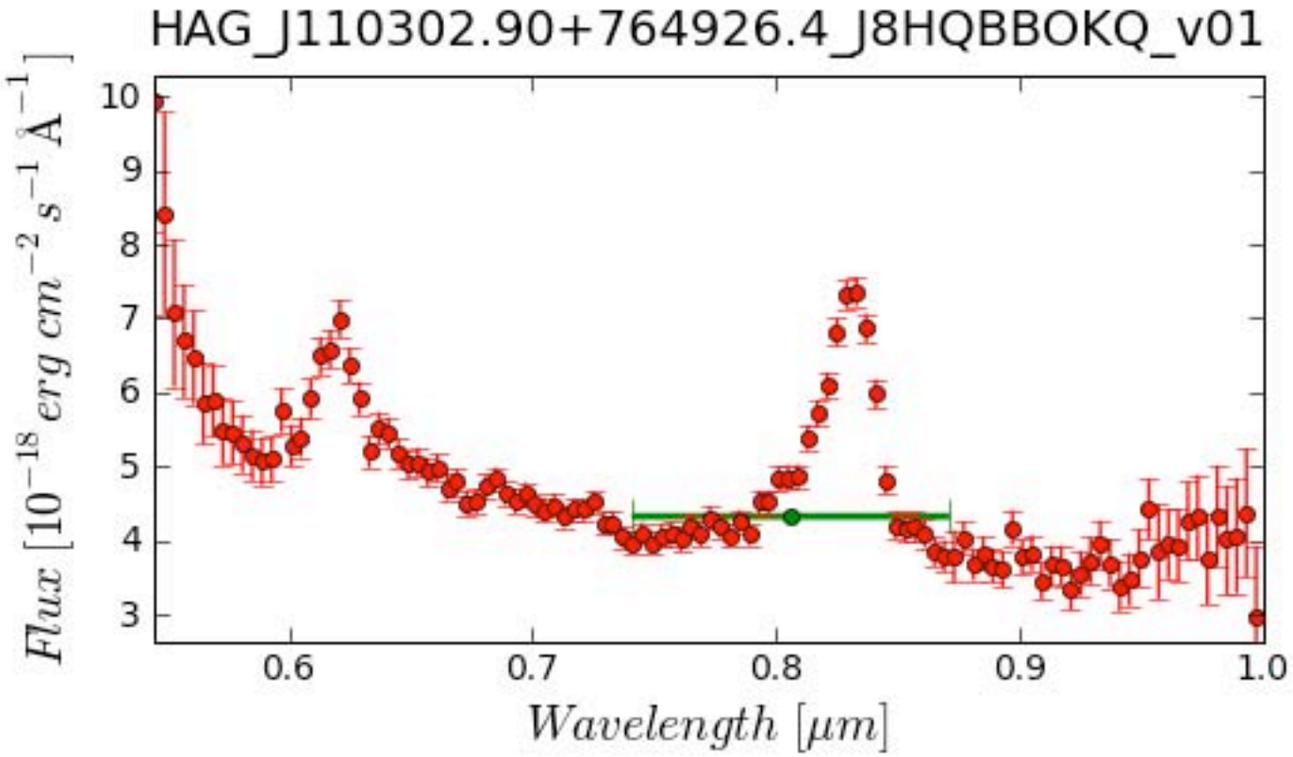


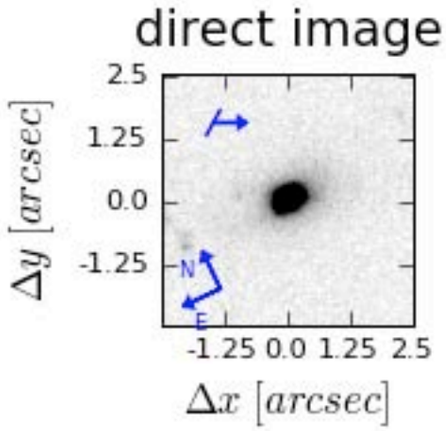


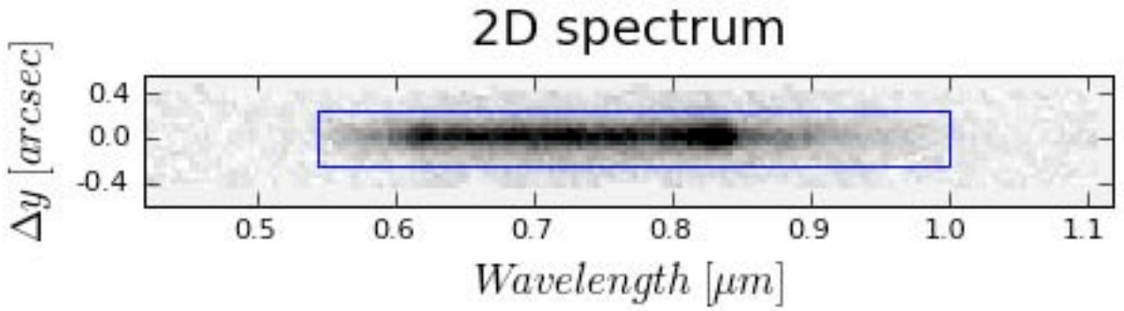


AB-magnitudes:

$F814W = 21.47$

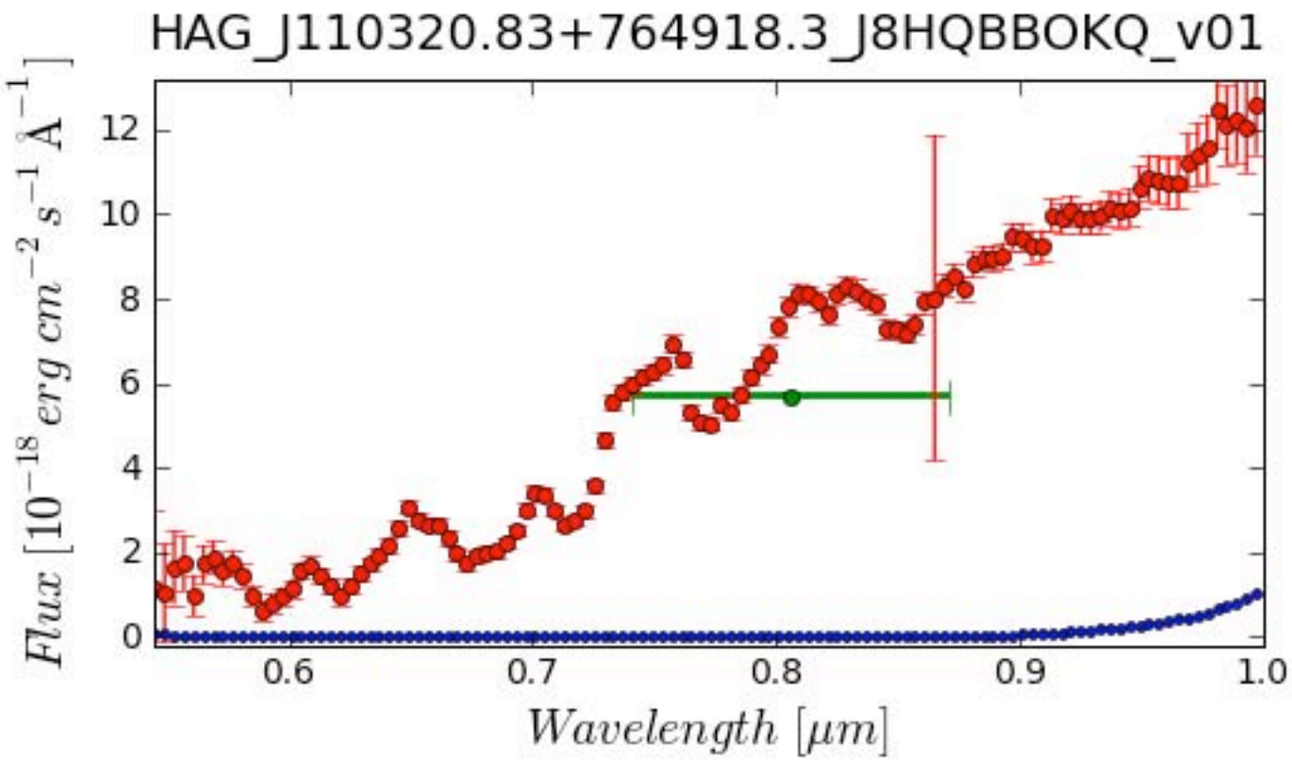


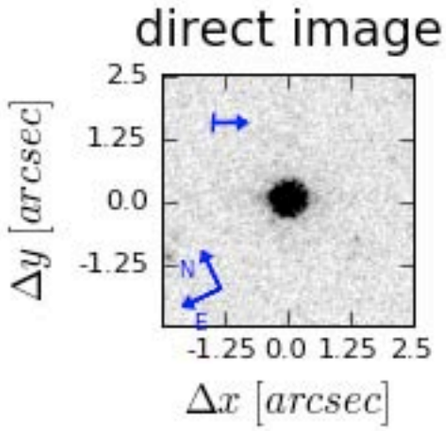


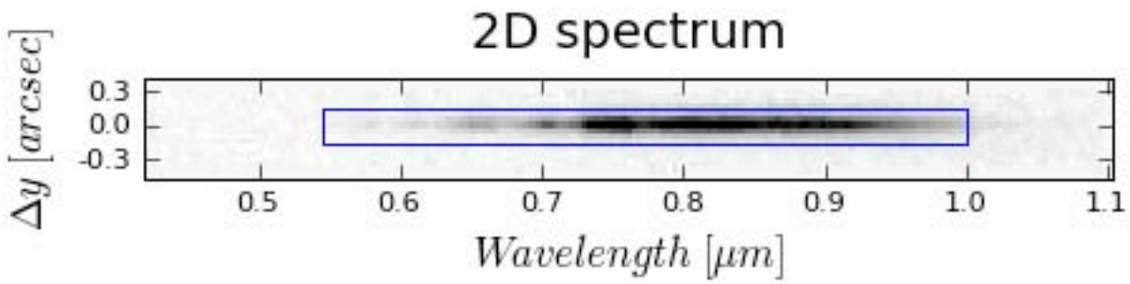


AB-magnitudes:

$F814W = 21.17$

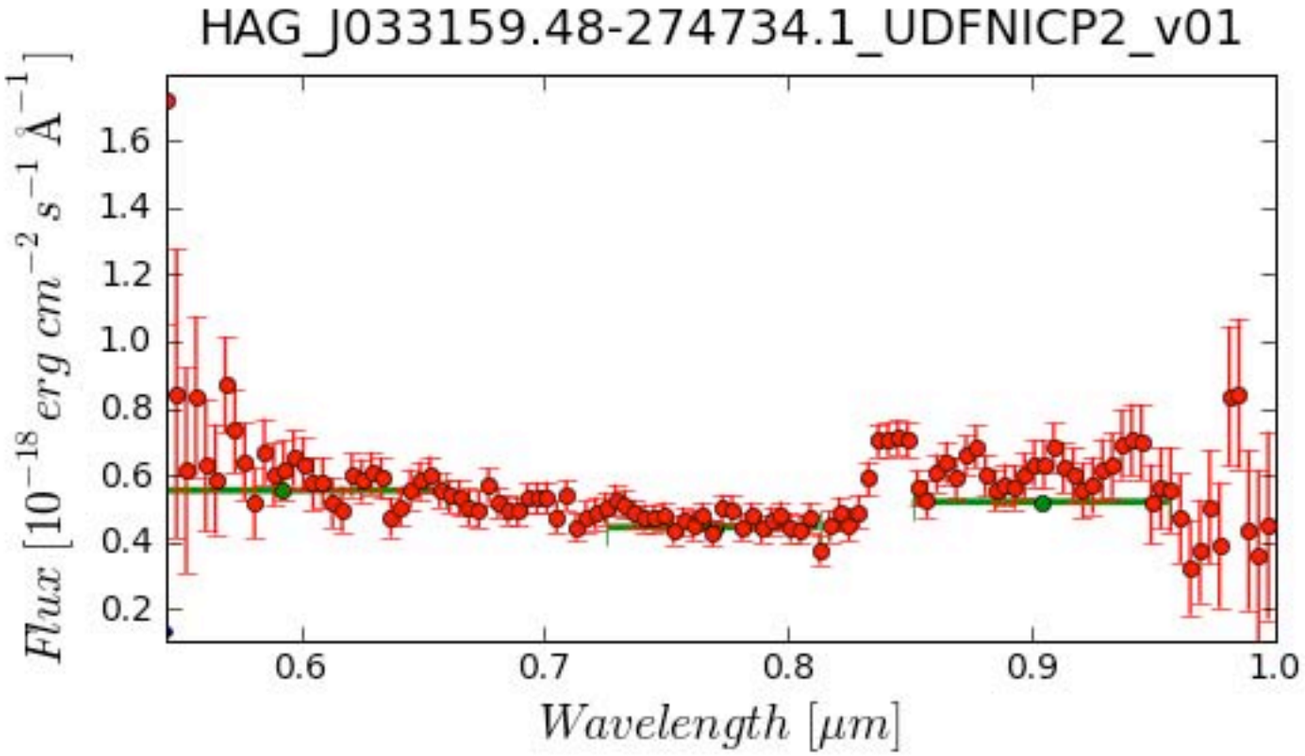


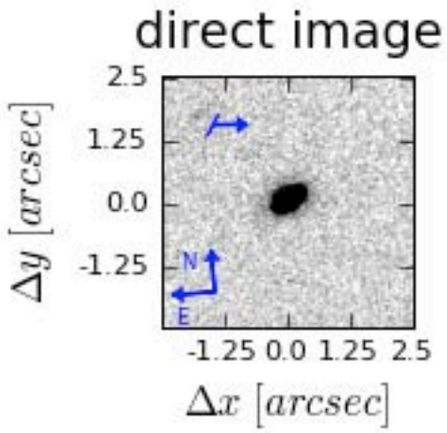


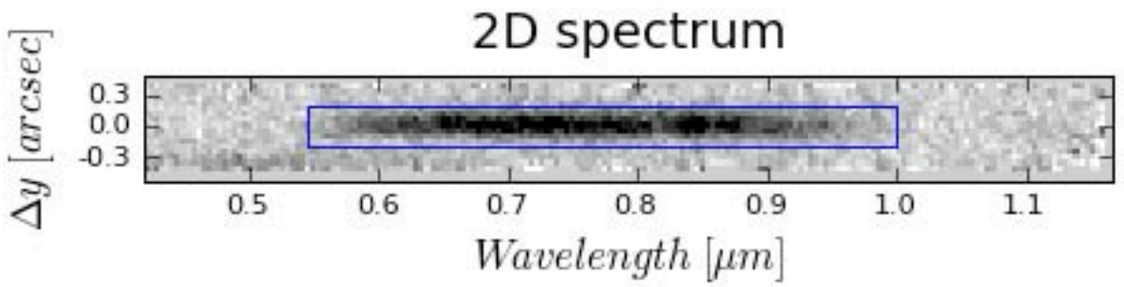


AB-magnitudes:

$F435W = 24.49$
$F606W = 24.37$
$F775W = 24.04$
$F850LP = 23.52$







Role of slitless spectroscopy

- Works well from space:
  - Sky is dark (especially in the NIR!)
  - Images are small (at least some objects are)
  - Goes very faint, around m_{AB} ~ 26 for a ctm. break
- Hubble has, STIS, NICMOS, ACS and WFC3 slitless modes
- High multiplex *but* get image overlap
- Good for SED shape and breaks *but* lines suffer from the low resolution (but WFC3 is PDG!)
- ESA/NASA dark energy mission may (will) use slitless spectroscopy
  - ST-ECF contributing expertise and simulations

Highlights Archive ~3FTE

- The HST Cache [ST-ECF, CADC, ESO]
  - Immediate access to all (up-to-date) data products (currently ~ 25TB), smooth operation in first full year
  - “Cheap-to-keep”
  - Continuously updated to reflect s/w and reference file changes
  - Metadata additions & improvements
  - Footprint creation
  - Download manager (only limited by network bandwidth)
    - Went online 1 Nov. 2008
      - ST-ECF: archive.eso.org/hst/science
      - CADC: cadc.hia.nrc.gc.ca/hst/science.html
- Incorporation of new (SM4) instruments done
- Negotiations with ESA and ESO for post-2010, low-cost operation
  - “Transfer of expertise” process started (STScI, ESO, CADC)
- User interface development (Form-based and “One-line”), released end of March

New User Interface

ST-ECF HST/HLA Science Archive

WFPC2B associations can be found here and the SM4 early release data is available here. The old archive search interface is still accessible here.

Query form | Result table | Get data

New | Contact | HST Cache | Acknowledgement | ST-ECF/CADC/STScI

Search | Reset

Query help

Archive ☑ HST ☑ HLA | **Type** ☑ science frames only | **Availability** ☑ available products only | **Members** ☑ hidden

One-line query

Constraints entered into this one-line query field are combined with those entered into the form interface below. Keywords can be dragged&dropped from below.

Position
- Target name (Simbad name)
- Target name (HST name)
- Target name (Solar body name)
- Target description
- File upload
- RA Dec
- Galactic coordinates
- Ecliptic coordinates
- Search box

00:10:00

- Spatial resolution
- ☐ Moving objects only

Energy
- Wavelength or band
- Bandwidth
- Filter/Grism/Prism

Optical element type: any

- Spectral resolution
- Resolving power

Time
- Observation date
- Exposure time
- Time start
- Time end

Observation

Data type: any

- PI name
- Proposal ID
- Proposal title
- Release date
- Dataset name
- Science extension
- Number of members

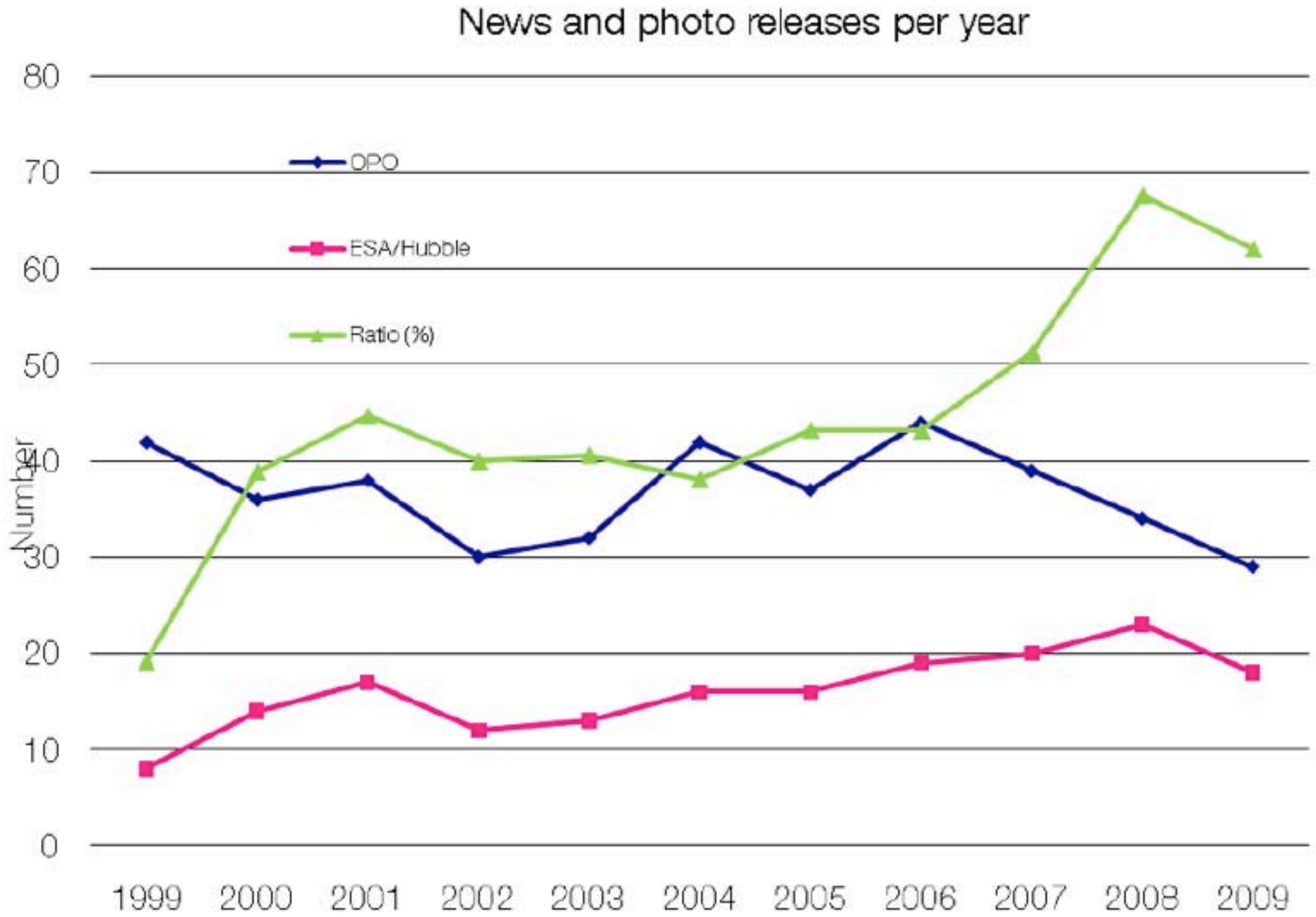
Instrument

Instrument: any, WFC3, COS, ACS, WFPC2, NICMOS, STIS, FOS, HRS, FOC, WFPC

- Detector
- Photon mode

- Interface available through ST-ECF and CADC
- Components are available to STScI
- Much useful feedback received, especially from STScI

Hubble outreach



Most wanted products

- Vodcasts (~3.5 million)
- Hubble 15thDVD (~800,000)
- Eyes on the Skies (~450,000)
- FITS Liberator User's Guide (163,611)
- FITS Liberator (~86,000)
- Broadcast videos (63,000 in 2008)
- Infrared Universe (~7,800)

Handover

- Software – including the aXe grism slitless spectroscopy package developed at the ST-ECF and the ST-ECF enhanced version of the Hubble PSF simulator Tiny Tim
- Data products, in particular the extracted spectral products from the HLA work
- Documentation, ISRs and also paper documentation. Metadata and database content Web pages
- Some archive facilities – such as the Solar Bodies system that can identify moving targets in Hubble (or other) images are of interest to both STScI and ESO

SPACE TELESCOPE
European Coordinating Facility

Hubblecast
FULL HD