RHESSI & STIX update virtual RHESSI meeting July 7 & 8, 2020

Säm Krucker UC Berkeley & FHNW

RHESSI flares 2002-2018



(Hannah/Glasgow)



5.87 x 0.38	SNR 8.50 Rel Flux 0.67	SNR 9.22 Rel Flux 0.77	SNR 8.24 Rel Flux 0.66	SNR 8.56 Rel Flux 1.0	SNR 7.77 Rel Flux 0.82	SNR 7.76 Rel Flux 1.0	
	RHES	SI arcl	niving	plan	~ 😤	*	
13.52 x 0.57	(next t		SNR 18.25 Rel Flux 0.76	SNR 18.03 Rel Flux 1.0	SNR 17.09 Rel Flux 0.86	SNR 18.35 Rel Flux 0.94	
•	Richar	d Sch	wartz/	Kim 7	Folbert) 😚	
22.45 x 0.58	SNR 28.51 Rel Flux 0.67	SNR 29.85 Rel Flux 0.79	SNR 27.71 Rel Flux 0.83	SNR 30.89 Rel Flux 0.92	SNR 30.09 Rel Flux 0.90	SNR 33.93 Rel Flux 1.0	
\$				*	1	~	
26.49 x 0.20	SNR 30.57 Rel Flux 0.26	SNR 36.25 Rel Flux 0.33	SNR 31.50 Rel Flux 0.44	SNR 32.30 Rel Flux 0.59	SNR 33.50 Rel Flux 0.65	SNR 38.13 Rel Flux 0.77	
11.62 x 0.16	SNR 14.04 Rel Flux 0.24	SNR 16.98 Rel Flux 0.27	SNR 13.93 Rel Flux 0.38	SNR 16.91 Rel Flux 0.45	SNR 17.44 Rel Flux 0.59	SNR 17.34 Rel Flux 0.69	
			0				

Potential future papers

- Individual events (e.g. Sept 10, 2017)
- New data archive will make it easier to do statistical studies
 - RHESSI X-class flare catalogue (imaging)
 - RHESSI/AIA microflare imaging
 - RHESSI/Nobeyama catalogue (Krucker et al. 2020), but much left to be done



STIX: HXR imaging spectrometer on Solar Orbiter

Detector

Module

Electronics



COLÁISTE NA TRÍONÓIDE

Summary of STIX status

- STIX works!
 - All 32 detectors (384 pixels) work
 - Imaging system looks good, but no images yet
 - Aspect system works
- Commissioning completed
 - April 14 through June 15
 - Thanks to the STIX commissioning team!
- 69 flares observed
 - 2 occulted M class flares
 - 67 microflares, largest at GOES B6 level



April 14, 2020

pqp

Mefcury

Mars

Sun

Earth

Venus

,so



DE LA RECHERCHE À L'INDUSTR

SPECTRUM OF ONBOARD CALIBRATION SOURCE



Olivier Limousin, Aline Meuris, Hugo Allaire (CEA)







Alexander Warmuth, Frederic Schuller (AIP)

Monitoring of Spacecraft pointing stability

- Rapid oscillations
 (3-5 min. period)
- Amplitude ~2-4"
- Oscillations with 30-40 min. period
- Highly variable in amplitude and frequency

after May 18: STIX ready for science









First STIX flare on May 18 (GOES A4)



NuSTAR/STIX microflare



NuSTAR observations during Parker Solar Probe perihelion (Jessie Duncan)

NuSTAR/STIX microflare



B6 flare on June 7th







B6 flare on June 7th: imaging

С

С

D



Observed variations in a few STIX detectors representing different angular scales (uncorrected phases)



STIX detector has 12 pixels for redundancy



Counts in large pixels (6-7 keV, 215 s)

10









Coarse Flare Location of 7th June B6 Event



Background Subtracted Counts

Ewan Dickson



UNIVERSITY OF GRAZ

Coarse Flare Location of 7th June B6 Event







Data access before start of nominal science phase

- All STIX data is available for collaborative studies
 - Contact individual team members to ensure proper data handling
 - Lightcurves and count spectra are available now
 - L1 data (counts in individual pixels)
 - L4 data (summed over pixels): spectrogram
 - Supporting software is under development, but not helpful yet
 - it will take several months to get STIX imaging software implemented

Telemetry files Packet database User data requests Operation requests Bulk science data Housekeeping QL light curves QL background montor QL energy spectra Calibration runs Detector tests Overview Etg	STIX	Image: Image					
Operation requests Bulk science data Housekeeping OL light curves OL background monitor OL energy spectra Calibration runs Detector tests Overview Elg	Telemetry files Packet database User data requests	x-axis UTC + y-axis linear + style line + 2 C Rebin Variance	ja " = =				
Bulk science data Housekeeping QL light curves QL background monitor QL energy spectra Calibration runs Detector tests Overview Elg	Operation requests	180	4 - 10 keV				
Housekeeping QL light curves QL background monitor QL energy spectra Calibration runs Detector tests Overview Elog Elog TTV weehpeage: Tetted TTV weehpeage: TTV w	Bulk science data	160	— 10 - 15 keV — 15 - 25 keV				
QL light curves QL background monitor QL energy spectra Calibration runs Detector tests Overview Elog	Housekeeping	- 140					
QL background monitor QL energy spectra Calibration runs Detector tests Overview Elog TIV weeppeage;	QL light curves		50 01100				
QL energy spectra 0 100	QL background monitor						
Calibration runs a_0 a_1 <th>QL energy spectra</th> <th></th> <th></th>	QL energy spectra						
Detector tests 60 10:10 May 29, 2020 10:20 10:30 10:40 10:50 11:00 11:10 11:20 11:30 Elog UTC	Calibration runs	80					
Overview 10:10 May 29, 2020 10:20 10:30 10:40 10:50 11:00 11:10 11:20 11:30 Elog UTC	Detector tests	60					
	Overview	10:10 10:20 10:30 10:40 10:50 11:00 11:10 11:20 11:30 May 29, 2020					
SIIV Menhage.	Elog	STIX webpage:	Edit chart »				

http://pub023.cs.technik.fhnw.ch

Hualin Xiao (hualin.xiao@fhnw.ch)

Solar Orbiter!

- All 10 instruments work
- 'Cruise' phase started end of June (STIX off)
- ESA press release set for July 16th
- Checkout windows in Feb, Mar, and Sep 2021
- Nominal science phase starts in November 2021
- STIX workshop planned for 2021
- STIX data from commissioning phase is open to everybody. Let's do science together!

Outlook for solar HXR imaging spectroscopy

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
RI	HESSI			S	ГIХ					
									→	>
			Η	XI on AS	os 🗕				→ -	>
]	FOXSI/FI	ERCE -		
	spectrometers only									
	HEL1OS on Aditya-L1									