Toward a complete SOFIA Archive

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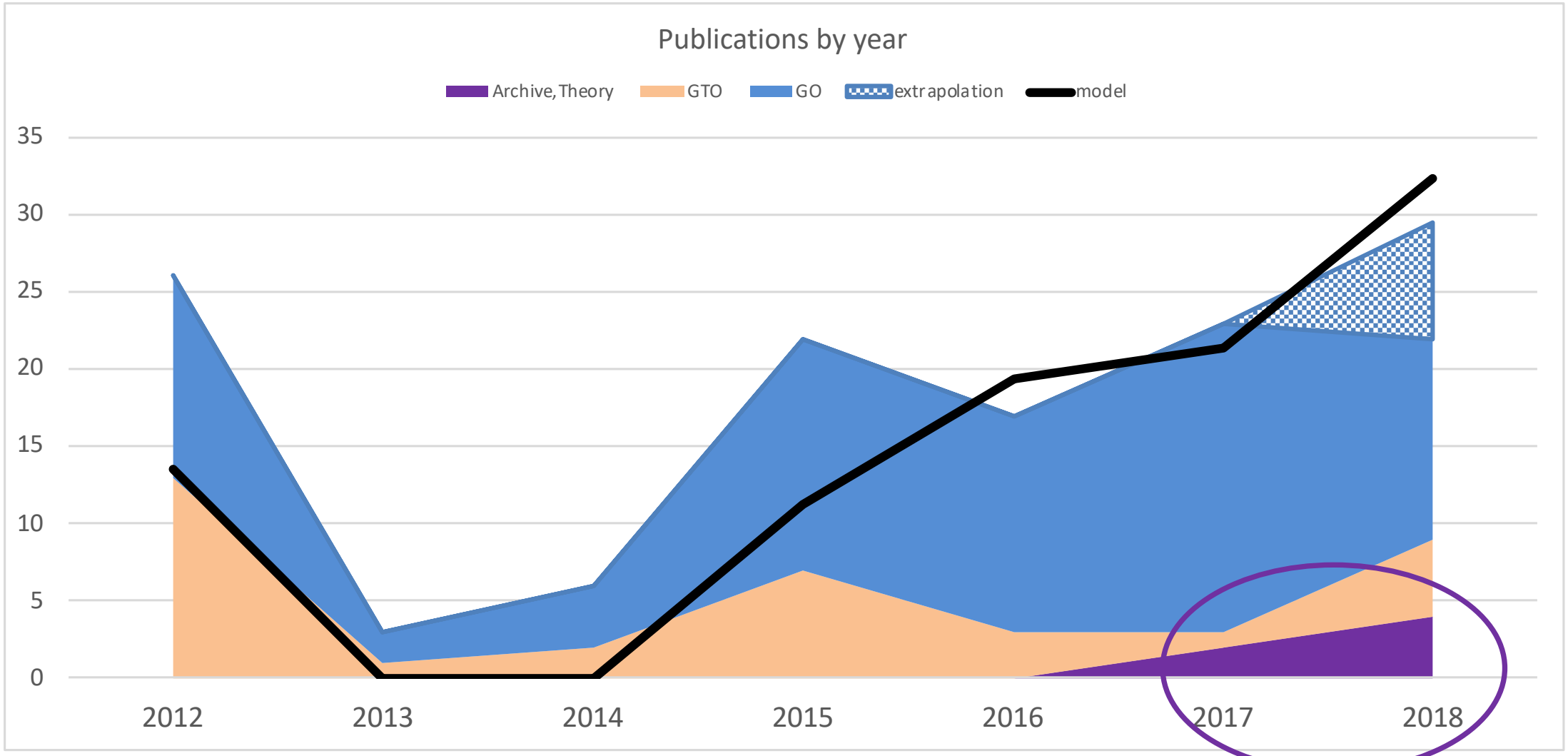
Statement of Purpose

- As the mission matures, archival research becomes a critical element of scientific productivity

1. SOFIA's archival research "wedge" is just beginning
2. Improvement in science archive interface: IRSA
3. Proposed addition of Archival Research Program
4. Encouraging publication

1. SOFIA's Publication Rate



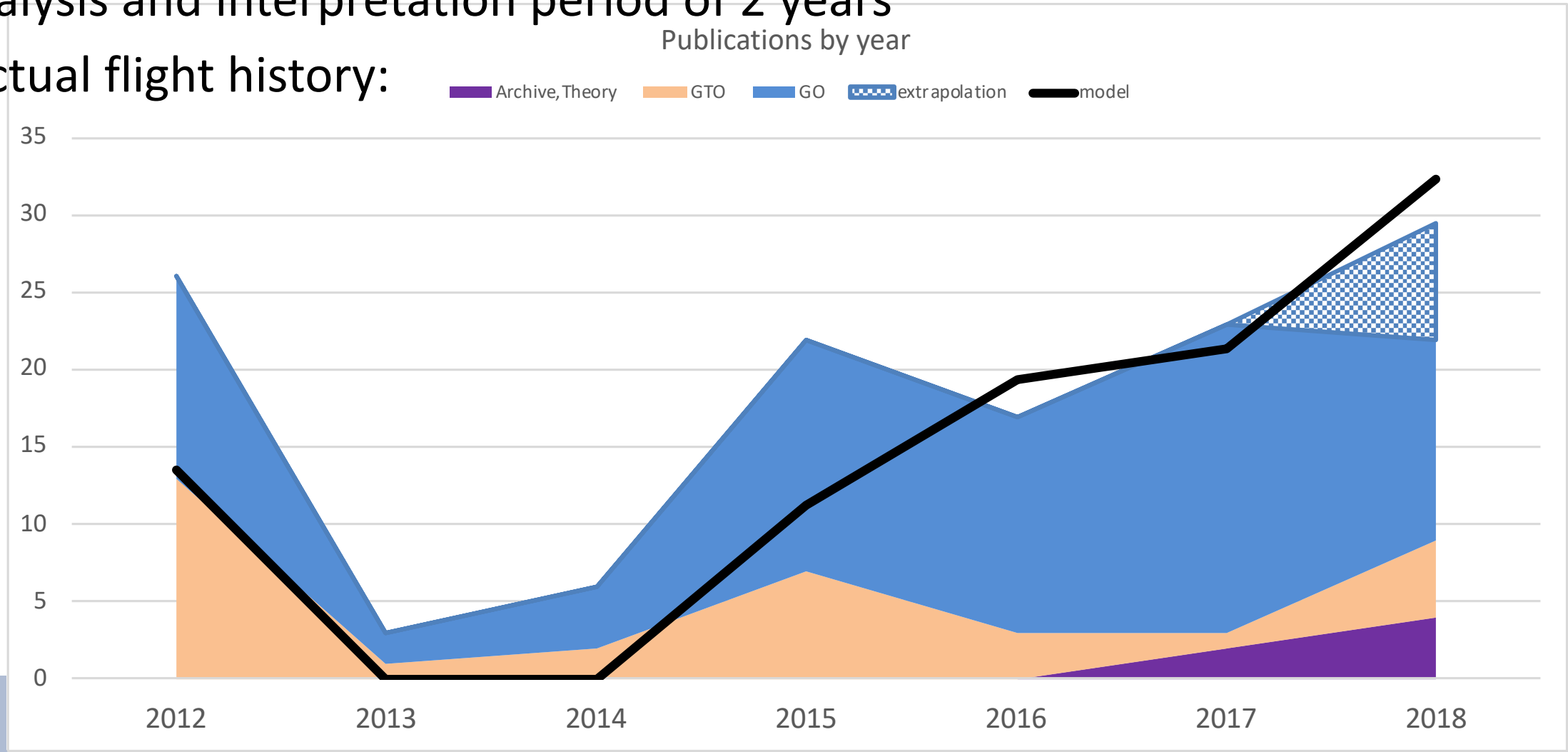
1. What is the publication rate GOAL?

- Assume publication rate proportional to observing time
- Ground-based observatories
  - 220 good nights/year, 8 hr/night
  - Pub rates: 11-21 hr/paper
- Space-based observatories
  - 10-19 hr/paper
- Adopt SOFIA goal 15 hr/paper

Telescope	#	Hours/ yr	pub/ yr	hours/ paper
Ground-based Observatories				
Gemini	2	3520	213	16.5
Keck	2	3520	165	21.3
Subaru	1	1760	101	17.4
IRTF	1	1760	108	16.2
VLT	4	7040	575	12.2
LaSillaESO	3	5280	235	11.2
Airborne Observatories				
SOFIA	1	800	53	15.0
Space-Based Observatories				
Hubble	1	7200	480	15.0
Herschel	1	5400	560	9.6
Chandra	1	7900	430	18.5

1. SOFIA Publication rate model

- Publication rate = 1 per 15 Research Hours flown
- Data analysis and interpretation period of 2 years
- Using actual flight history:



SOFIA
Stratospheric Observatory for Infrared Astronomy

2. Science Archive transition to IRSA

- NASA recognizes importance of a robust archive and has funded an effort to transition the archive from NASA Ames to IRSA/IPAC
- Infrared Science Archive (IRSA; led by H. Teplitz) at the Infrared Processing and Analysis Center (IPAC; led by G. Helou)
- IRSA provides access to more than 20 billion astronomical products, including all-sky coverage in 24 bands

➢July 2018: SOFIA/IRSA Design Walkthrough

➢October 2018: SOFIA/IRSA Data Review (all Cycle 4-5 data)

➢Feb 2019: SOFIA/IRSA First release (2 of FORCAST, FIFI-LS, GREAT)


ipac
IRSA
NASA/IPAC INFRARED SCIENCE ARCHIVE
IRSA | DATA SETS | SEARCH | TOOLS | HELP
Login
Search for Source
Name or Coordinates
Search
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arcsec
Guide for Solar System Observers
Search Catalog: WISE
Search
SOFIA Archive at IRSA
SOFIA data are now available at IRSA!
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Spitzer
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Herschel
Planck
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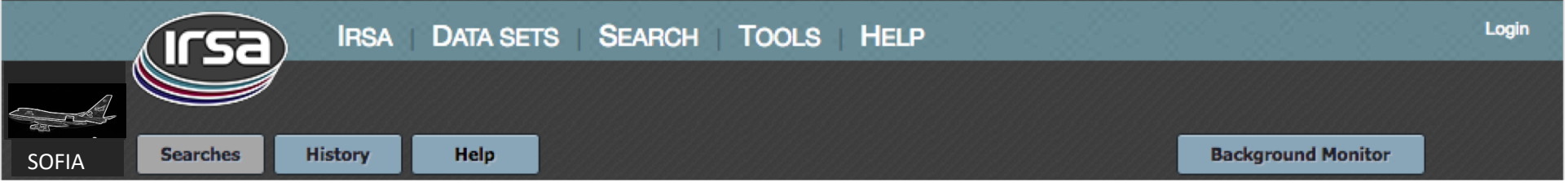
MORE
Knowledgebase
Documentation
Video Tutorials
Help Desk



SOFIA Search

Spatial Constraints

- ○ Object/Position
- ○ Multiple Positions
- ○ NAIF ID
- ○ Precovery
- ● All-Sky

No spatial constraints requested.

Proposal Constraints

Abstract Text:

Program / Plan ID:

Primary Investigator:

Observation Constraints

Mission ID:

AOR ID:

Observation Constraints

?

Mission ID:

AOR ID:

Observation Date:

Instrument Constraints

?

- Any
- FIFI-LS
- FORCAST
- GREAT

Data Product Constraints

?

Processing Stage: ☐ Level 0 ☐ Level 1 ☐ Level 2 ☐ Level 3 ☐ Level 4

Observation Type: Any

Product Type: Any

IRSA | DATA SETS | SEARCH | TOOLS | HELP

Login

SOFIA

Searches | History | Help | Catalogs | Background Monitor

AOR | L0 | L1 | L2 | L3 | L4 ?

Prepare Download

	Name	ra	dec	Instrument	config
☐					
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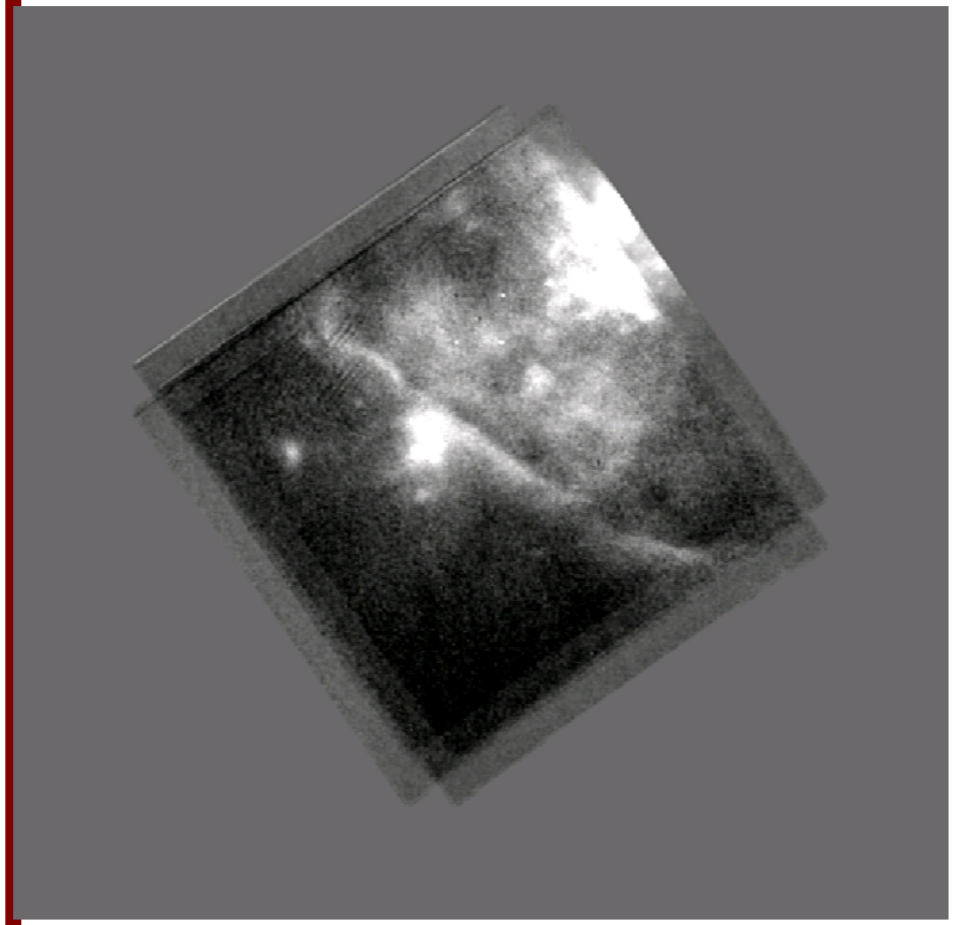
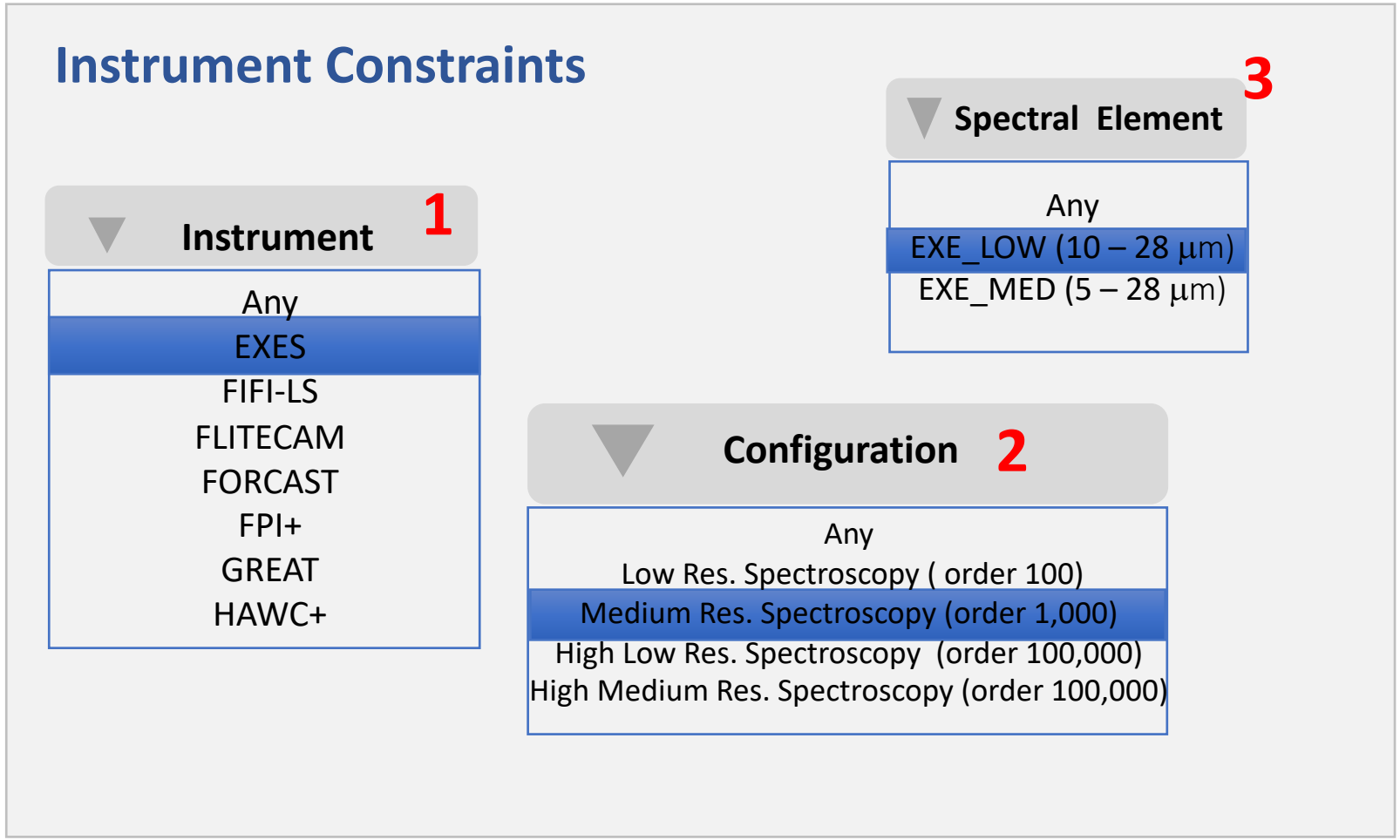
Details | Data | Coverage ?

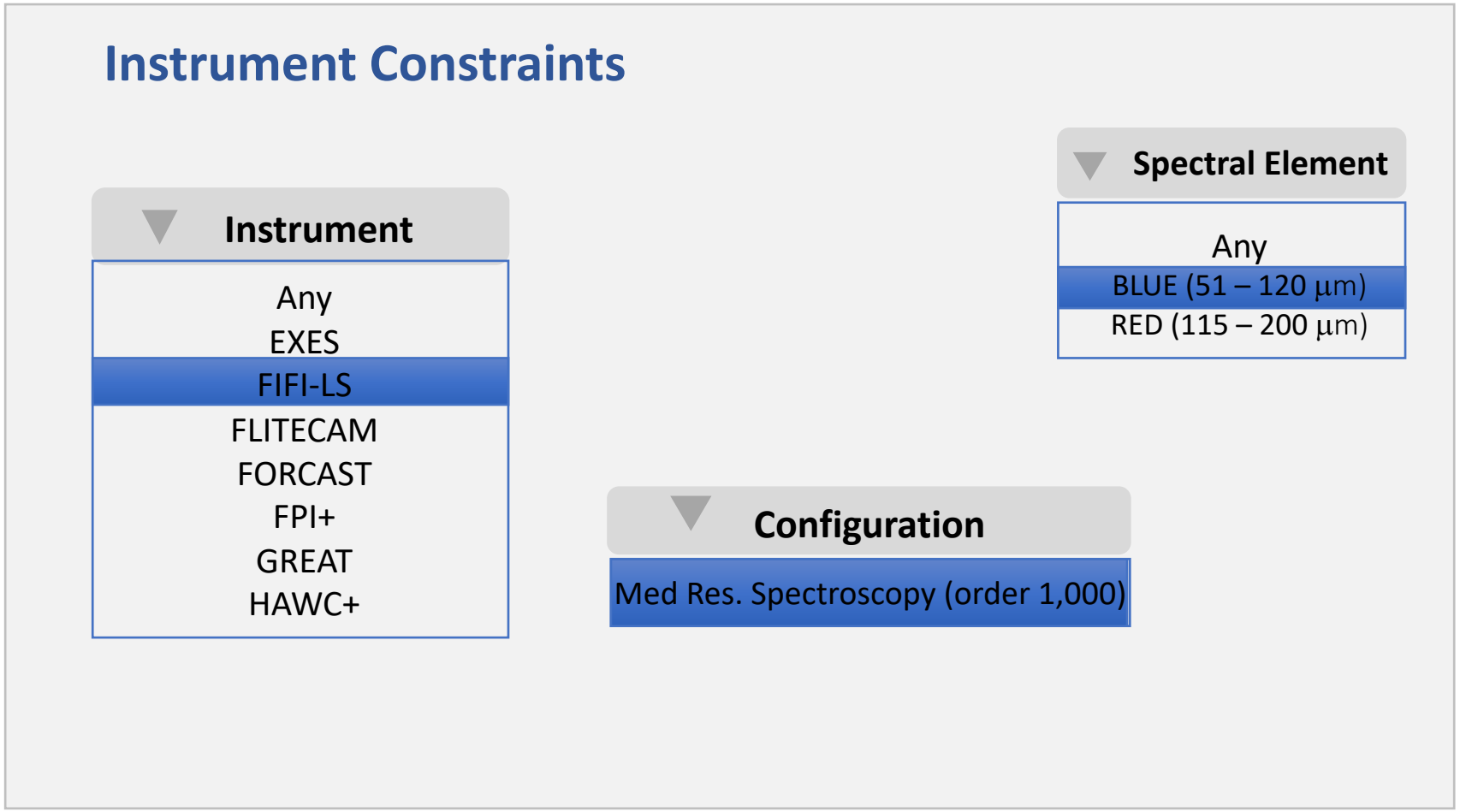


NASA DLR USRA DSI

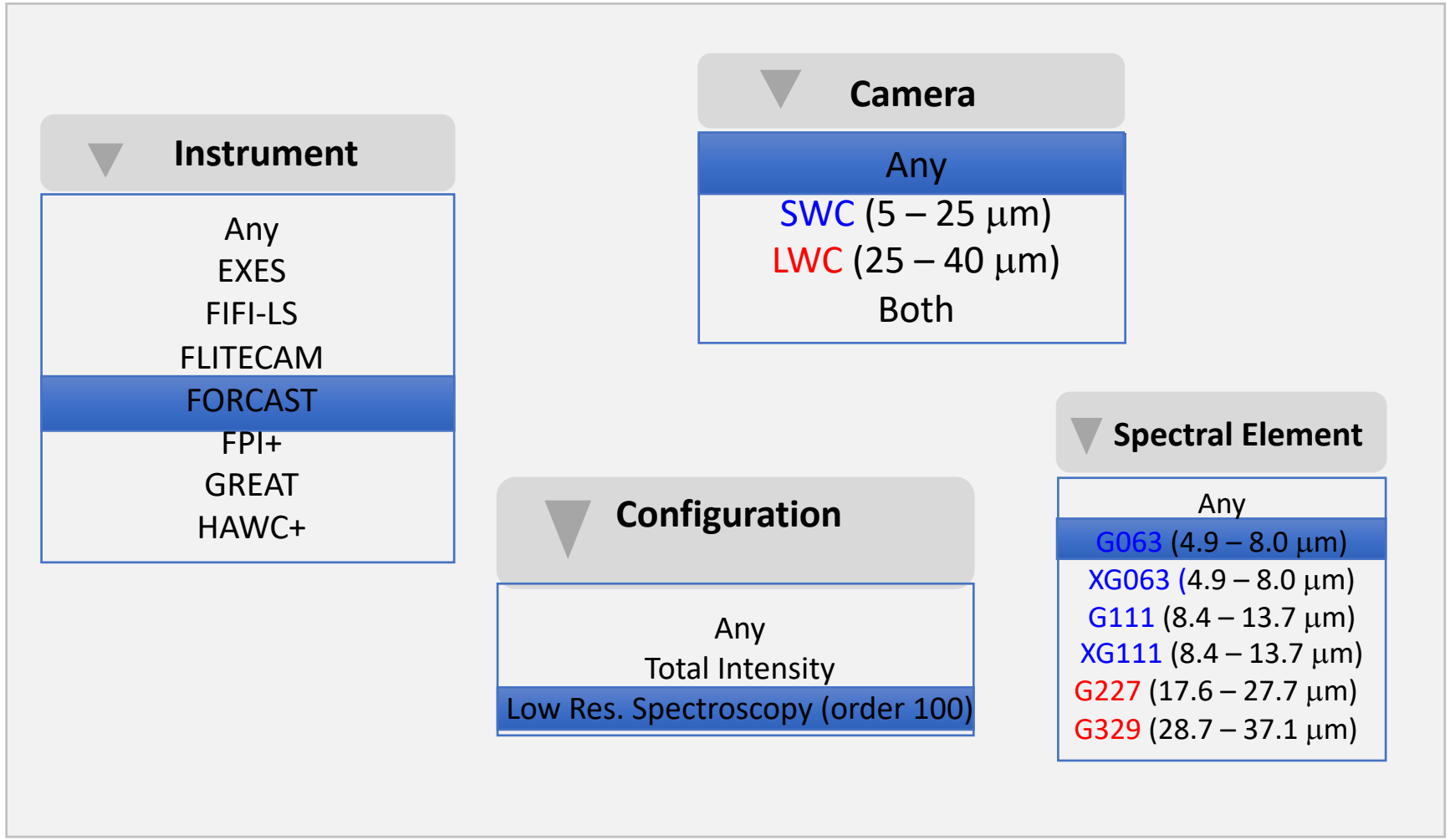
SOFIA/IRSA example instrument selection: EXES



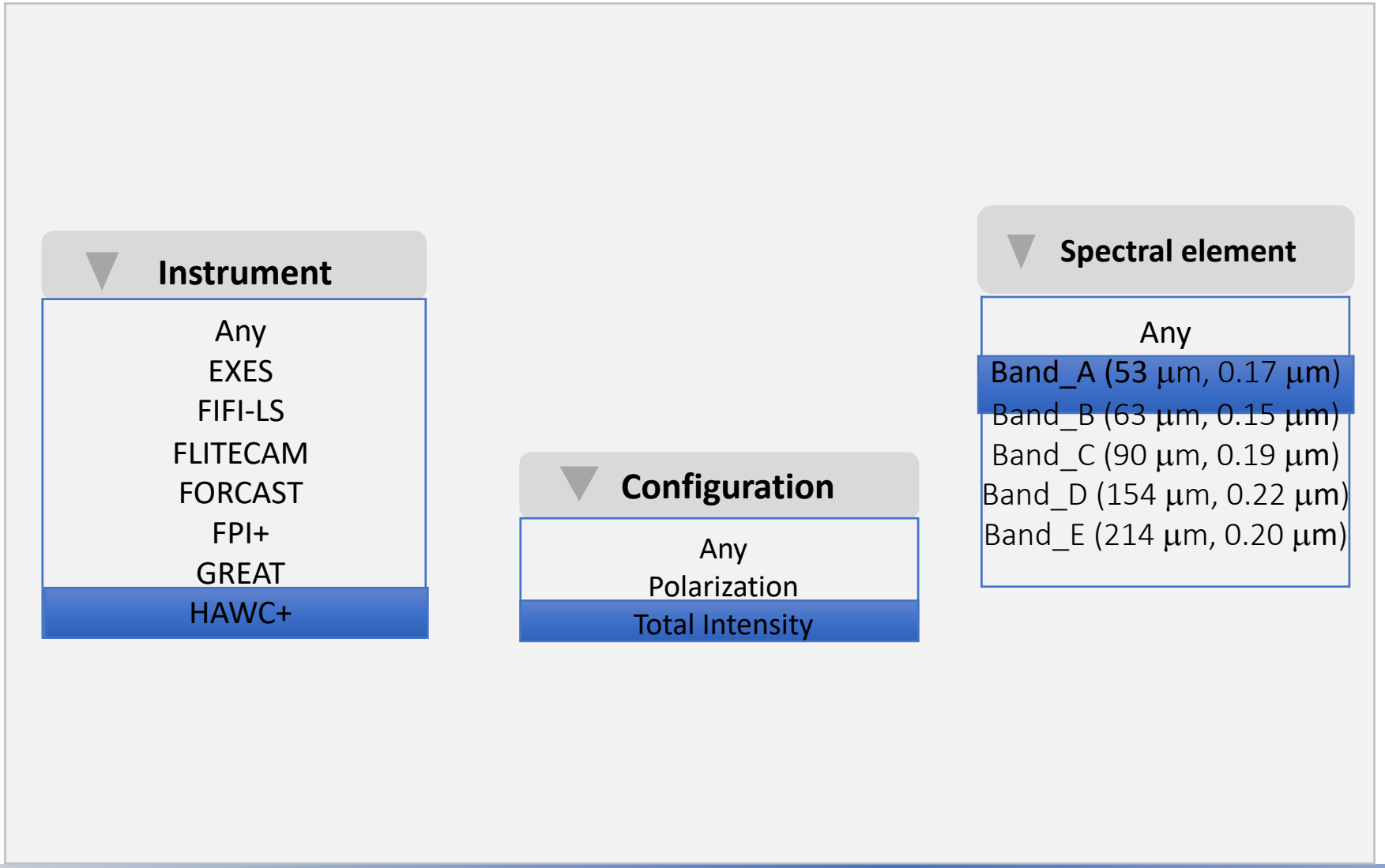
SOFIA/IRSA example instrument selection: FIFI-LS



SOFIA/IRSA example instrument selection: FORCAST



SOFIA/IRSA example instrument selection: HAWC+



3. Proposed addition of Archival Research Program

- SOFIA is considering adding a funded Archival Research Program
  - Hubble, Chandra have many Cycles of funded archival research
  - Specifically-SOFIA research would no longer be eligible for the NASA Astrophysics Data Analysis Program (*multi-mission still included*)
- Synchronize Archival Call with annual Guest Observer & Legacy Calls
- Total funds being considered $500k/yr
  - 10% compared to total funding for Observers of $5M/year
- Goal is to encourage studies encompassing multiple projects
  - Classes of target
  - Multi-instrument, comprehensive studies of regions
  - Encouraging publication of “orphaned” data

4. Encouraging Publications

- “Event” driven encouragement
  - Meeting-in-Meeting at June 2018 Denver AAS
  - Special Session at Jan 2019 Seattle AAS
  - Forthcoming Special Issue of Journal of Astronomical Instrumentation
  - Forthcoming Focus Issue of ApJL
- Routine monitoring and “nagging”
  - Publication status tracked and reported to SOFIA Users Group on a per-project basis
  - Guest Observers contacted by Instrument Scientist through project lifetime
  - Guest Observers contacted by senior science staff wen publication overdue
  - Annual survey of Guest Observers includes publication status queries

4. ApJL Focus Issue

First results of HAWC+ and FIFI-LS instruments

- 13 articles for issue
- 7 submitted
- 2 accepted
- *Goal to open by end of 2018*

Author	SI	OBSID	Focus Issue	Agreed	Submitted	Accepted	Title
Lopez-Rodriguez	HAWC	05_0071	link	early	x	x	Cygnus A
Ma/Cooray	HAWC	05_0087	link	early	x	x	Starburst z~1
Busch	FIFI	04_0056, 0	y	6/21/18	x	x	The Close AGN Reference Survey (CARS): SOFIA detects spatially-resolved [CII] emission in the luminous AGN HE0433-1028
Clemens	HAWC	04_0026	link	early	x	x	GF9-2
Indriolo	EXES		y	x	x	x	High spectral resolution observations toward Orion BN at 6 μm: no evidence for hot water.
Simpson	FIFI	05_0082	y	6/26/18	x		FIFI-LS Observations of Sgr B1: Ionization Structure and Sources of Excitation
Pineda & Stutzki	FIFI	04_0116	y	x	x		A SOFIA Survey of [C ii] in the M51 Galaxy: [C ii] as a tracer of Star Formation
Pitts, Barnes	FIFI	04_0061	y	6/26/18	x		Gemini, SOFIA, and ATCA Reveal Very Young, Massive Protostars in the Collapsing Molecular Cloud BYF 73
Barr	EXES		y	x	x		Detection of Ro-vibrational Transitions of CS in Hot Core AFGL 2591 at High Spectral Resolution with SOFIA/EXES
Sparks	EXES		y	8/26/18	x		A SEARCH FOR WATER VAPOR PLUMES O
Bigiel & Krabbe	FIFI	04_0139 &	y	2/20/18			NGC 6946
Chuss	HAWC	GTO	y	7/1/18			OMC1
Klein	FIFI	04_0049	y	2/2/2018			M17 PDR
Rho & Tielens	FIFI	02_0058 &	y	2/1/2018			SOFIA FIFI-LS [O III] and [O I] Observations towards dense ejecta knows in the Supernova Remannt Cas A
Santos	HAWC	GTO	y	8/3/18			Rho Oph
Dungee	EXES		y	x			High Resolution SOFIA/EXES Spectroscopy of SO2 Gas in the Massive Young Stellar Object MonR2 IRS3: Implications for the Sulfur Budget

4. Dec 2018 Special Issue of JAI - *status*

1. Ali et al.: A Review of Science Ground Operations for the Stratospheric Observatory for Infrared Astronomy (SOFIA) (Accepted)
2. Colditz et al.: Spectral and Spatial Characterization and Calibration of FIFI-LS - the Field Imaging Spectrometer on SOFIA (Accepted)
3. Ennico et al.: An Overview of the Stratospheric Observatory for Infrared Astronomy since Full Operation Capacity (Under review)
4. Fischer et al.: FIFI-LS: The Field Imaging Far-Infrared Line Spectrometer on SOFIA (Accepted)
5. Graf et al.: Image Size and Control System Developments of the Airborne Telescope SOFIA (Accepted)
6. Herter et al. FORCAST: A Mid-Infrared Camera for SOFIA (Accepted)
7. Lammen et al.: Increasing the SOFIA Secondary Mirror Mechanism's fast steering capability by identification of a structural resonance and its subsequent elimination through mass redistribution. (Accepted)
8. Leppik et al.: SOFIA Flight Planning and Execution (Accepted)
9. Pfueller et al.: The SOFIA Focal Plane Imager: A highly sensitive and fast Photometer for the wavelength range 0.4 to 1 micron (Accepted)
10. Reinacher et al.:The SOFIA Telescope in Full Operation (Accepted)
11. Richards et all. HIRMES: Looking forward to the HIgh-Resolution Mid-infrarEd Spectrometer (Under review)
12. Richter et al.: The Echelon-cross-Echelle Spectrograph for SOFIA (Under Review)
13. Risacher et al.:The 4GREAT spectrometer for the SOFIA Observatory (Under Review)
14. Runyan et al.: The HAWC+ Far Infrared Camera and Polarimeter for SOFIA. (Accepted)
15. Temi et al.: SOFIA at Full Operation Capability: Technical Performance (Under review)

4. Exploiting Data in the Archive

- Effort to date has focused on encouraging guest observers to publish their data
- New emphasis (comments welcome) will be on advertising large or orphaned datasets. Ideas:
  - Web page listing large datasets, links to any papers, guide to data
  - Same for “orphaned” programs
  - Newsletter table
  - more ideas?

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