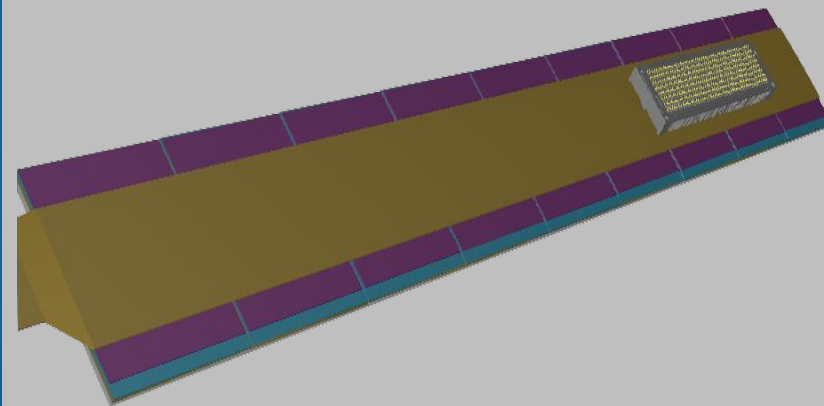


*The ePIC Barrel Imaging Calorimeter*

# Summary - AstroPix Wafers, Modules, and Staves



Manoj Jadhav  
Argonne National Laboratory

4<sup>th</sup> BIC In-person Workshop  
April 09-11, 2025



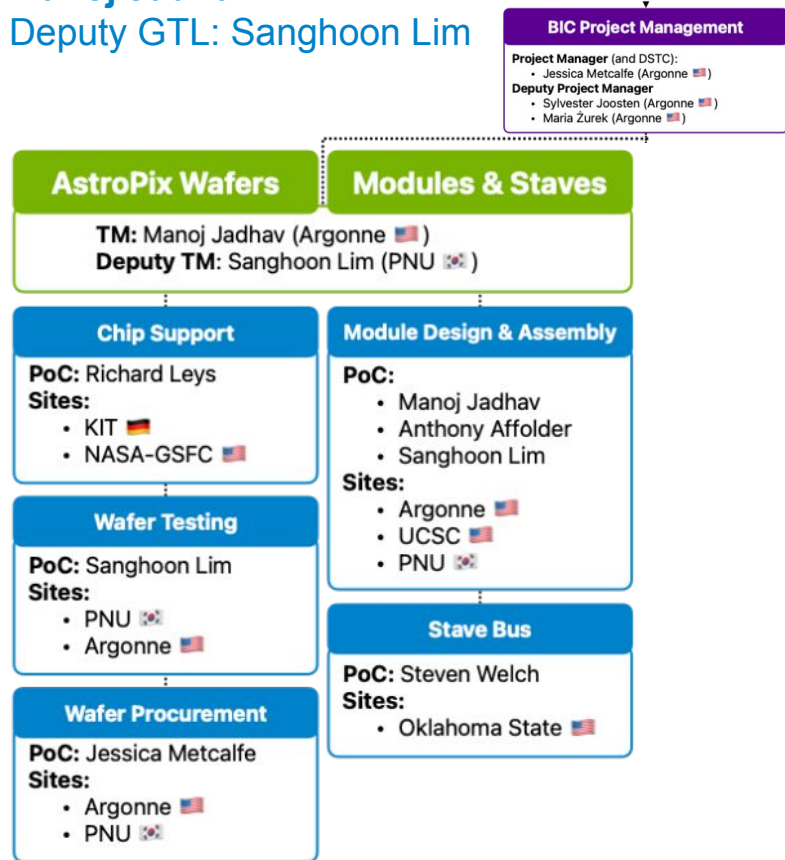
# Green Team - (Missing slide from day-1)



## GTL - AstroPix Wafers + BIC Modules and Staves

Manoj Jadhav

Deputy GTL: Sanghoon Lim



### Work Package Scopes:

- **Chip Support (Richard)**
  - Chip design
  - Version 5 for PREP
  - Version 6 for Production
- **Wafer Testing (Sanghoon)**
  - QC procedure
  - Wafer/chip QC
  - Wafer dicing and metrology
- **Wafer procurement (Jessica)**
  - Wafer procurement
- **Module/Stave Design and Assembly (Manoj, Tony, Sanghoon)**
  - Assembly, loading, and QC procedure
  - Handling and carrier toolings
  - Module assembly and QC
  - Stave loading and QC
- **Stave Bus (actually Module Hybrid-PCB - AstroLinx) (Steven, Blake)**
  - AstroLinx design and fabrication (v3 and v5)
  - Update to AstroLinx for Production (v6)
  - AstroLinx QC

### Meetings -

#### Wafers

Monday at 5 pm CT

Planning for new time slot

#### Modules and Staves

Monday at 4:30 pm CT

Currently alternate week

# Outline

Thanks a lot for superb work and presentations, great discussion and support!



## Wafers, Modules, & Staves

Manoj Jadhav



D.

**Wire bond map, wire bondability, Ha...**

Forest Martinez-M...

D172, Building 241

12:00 - 12:20

**Handling, Carrier tools**

Kirsten Affolder et al.



**9-chip PCB testing**

Bobae Kim



D172, Building 241

12:40 - 13:00

**Overview of AstroPix performance**

DANIEL P. VIOLE...



**Modules: & Wafers**

Manoj Jadhav

D172, Building 241

15:30 - 17:00

Wednesday,  
April 9<sup>th</sup>

Joint Mechanics & Modules Manoj Jadhav, Sylvester Joosten

We missed it!  
We should plan  
discussion during  
weekly meetings!

D172, Building 241

16:00 - 17:30

**AstroPix Overall Plans and Schedule (NASA, ComPair, AMEGO-X)**

Regina Caputo



D172, Building 241

09:00 - 09:20

**AstroPix v5 Design Overview**

Nicolas Striebig



D172, Building 241

09:20 - 09:40

**Wafer/Chip Testing Progress & Plans**

Sanghoon Lim



D172, Building 241

09:40 - 10:00

**Break**

D172, Building 241

10:00 - 10:30

**AstroLinX**

Blake Beauchamp et al.



10:30 - 10:50

**Joint Modules & System Test**

Manoj Jadhav, Maria Zurek

D172, Building 241

13:30 - 15:00

**Modules: & Wafers**

Manoj Jadhav

D172, Building 241

15:30 - 17:00

Thursday,  
April 10<sup>th</sup>

# Outline

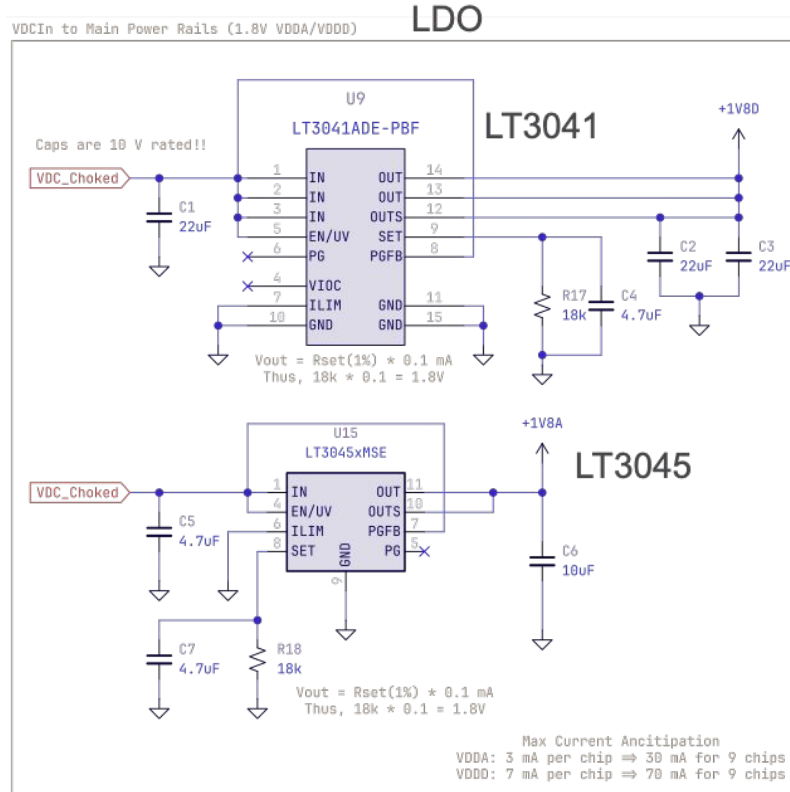
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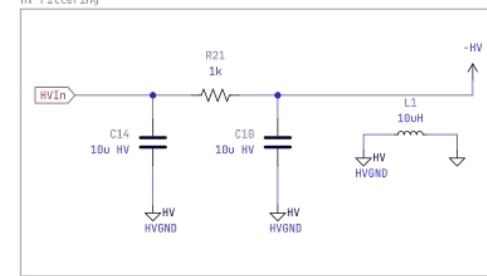
- Handling tools and wirebonding - discussion about, handling tool, wirebonding, alignment, glue, etc
- wafer QC - QC test (list), test setup development, number of wafers/chip, SEE/SEU, timeline
- AstroLinX - Design, pin-out for v3, wire-bonding, sizes, pickup area, (enough information to finish design).
- Astropix v5 design and overall AstroPix schedule (NASA) - NASA schedule for AstrtoPix APRA, visited performances of v3 and v4, daisy chaining,
- Cross WBS discussions - intense discussion with system testing on QC tests, calibration (inj vs source, depletion, calibration vs. energy resolution, time )
- Module QC vs Stave QC - time, procedure, pros and cons. Use preproduction as practice to define way forward..
- PED/PREP schedule - Schedule looks good till module PED, on coming Monday we will go over schedule for PREP

# BACKUP

# AstroPix Module Test PCB

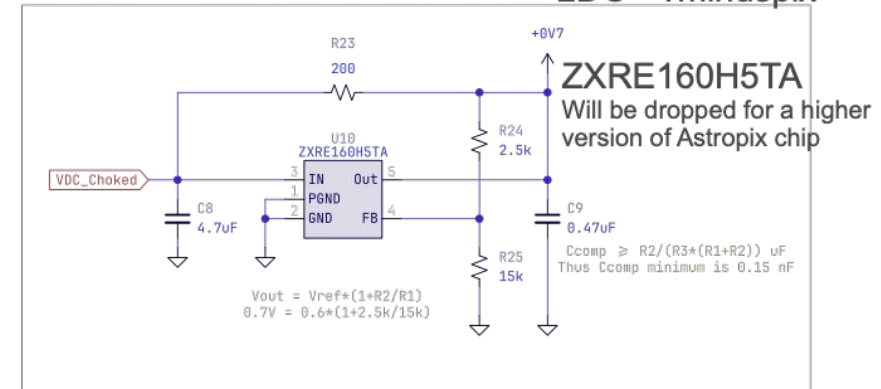


## HV Filtering

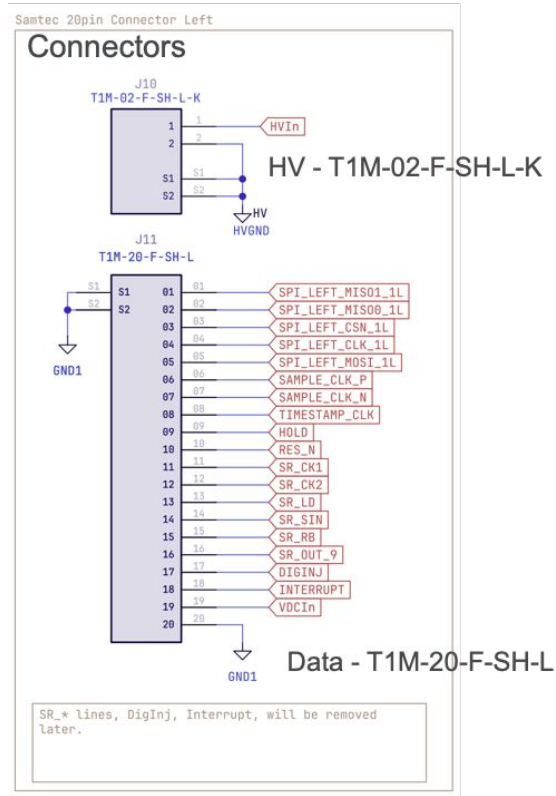


Shunt Regulator for Vssminpix (0.7V) Input (Astropix V3 Only)

## LDO - vminuspix



# AstroPix Module Test PCB



List of I/O		
	V3	V5 (Not Final - need in)
Power	HVIn	HVIn
	HV GND	HV GND
	VDCIN	VDCIN
SPI	MISO0	MISO0
	MISO1	MISO1
	CSN	CSN
	CLK	CLK
	MOSI	MOSI
Sample Clk	SAMPLE_CLK_P	SAMPLE_CLK_P
	SAMPLE_CLK_N	SAMPLE_CLK_N
Shift Register	SR_Ck1	
	SR_Ck2	
	SR_LD	
	SR_SIN	
	SR_RB	
	SR_OUT	
Other	DIGINJ	
	INTERRUPT	
	TIMESTAMP_CLK	TIMESTAMP_CLK
	Hold	
	RES_N	