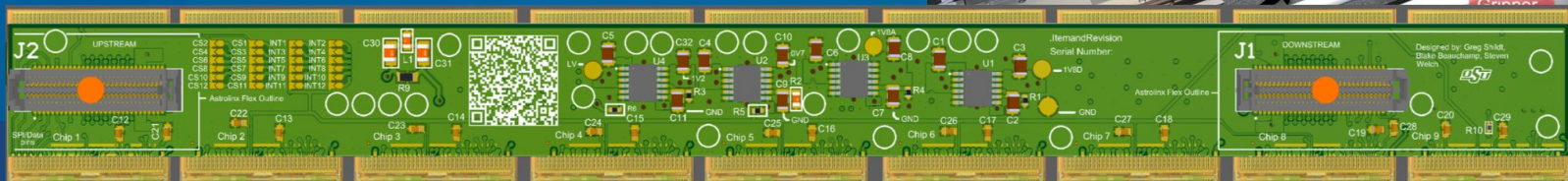
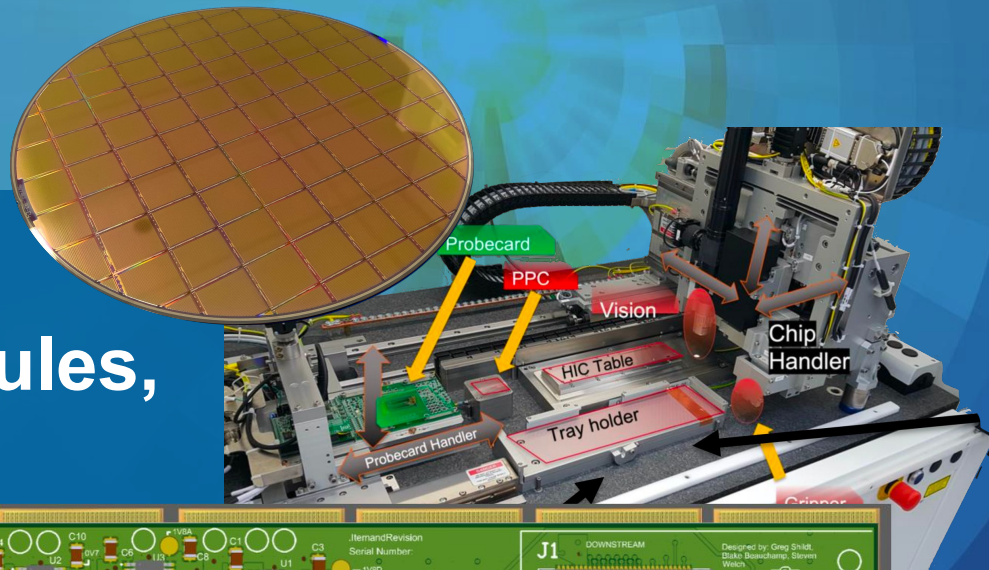


The ePIC Barrel Imaging Calorimeter

AstroPix Wafers, Modules, and Staves QA/QC



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AstroPix Chips



- **Visual Inspection**
 - Physics damages - image recognition
- **IV Measurement**
 - HV bias up to -300-400V [breakdown check]
- **CV Measurement ? or TCT - wafer batch, test articles?**
 - Depletion depth and full depletion voltage
- **Power On**
 - Configure the chip using default DAC settings
 - Maybe check heartbeat?
 - What do we have to check if chip is configured correctly?
- **Injection Capacitance**
 - briefly discussed yesterday (might be good to check at initia stage)
- **Noise scan**
 - pixel masking
- **Threshold Tuning**
 - tune DACs optimization
 - S-curve matching
- **Injection Scan**
 - calibration
- **FIFO**
 - check the event transfer rate (can be dropped later?)

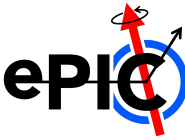
QA framework 1/2

• List of chip test items for ALICE ALPIDE (also applicable to AstroPix_v3)

1. **Powering test:** power on/off
2. **Vbb I-V test:** apply the reverse substrate bias from 0 V down to -6 V
3. **DAC scan:** verify that each DAC is working by scanning through all its code words
4. **Power on reset test:** check the functionality of power on reset
5. **SEU check:** monitor the SEU counter and the flag bits on idle operation
6. **Register test:** check all registers by writing and reading back to find stuck bit
7. **FIFO test:** check all the generated memory blocks
8. **Data port test:** verify its functionality to send quasi-static patterns in case of the readout test failure
9. **Digital scan:** inject single hits directly into the in-pixel memories and read back
10. **Fake hit rate:** measures the number of noisy pixels and faulty front-ends
11. **Analog scan DP:** exercise the analog front-end and the full readout chain of ALPIDE
12. **Threshold scan:** test all analog front-ends/pixels by using analog pulse injection
13. **High-speed link check:** check its functionality (N/A to AstroPix_v3)
 - **Daisy chain SPI interface:** test the interface is working (only to AstroPix_v3)

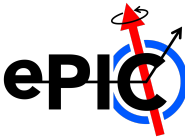


AstroPix Modules/Staves



- **Visual Inspection**
 - Physics damages (chip, pcb, wirebonds)
- **IV Measurement**
 - HV bias up to -300-400V [breakdown check]
- **Power On**
 - Configure the chip using **optimized DAC settings from Chip QC**
- **Noise scan**
 - pixel masking - **look for additional pixels to be masked**
- **Threshold Tuning**
 - **Use yml file optimized during chip QC**
 - S-curve check
- **Injection Scan**
 - calibration - **fewer points, fewer pixels???**
- **Daisy chaining**
 - On Module
 - Cross modules
 - check the event transfer rate
- **Calibration with source???**
 - We had a discussion yesterday
 - batch wise - few module to dedicated site??

AstroPix Modules/Staves - To do



- Set up the procedure
- Build the software package
- Build hardware to performance testing - Testbox
- PDB building and maintenance
- Understand how long each QC test takes
- Understand total QC time per module vs. throughput needed
- optimization of QC procedure

BACKUP