Electrical Characterization of Pre-Production Staves for the ATLAS ITk Strip Detector Upgrade

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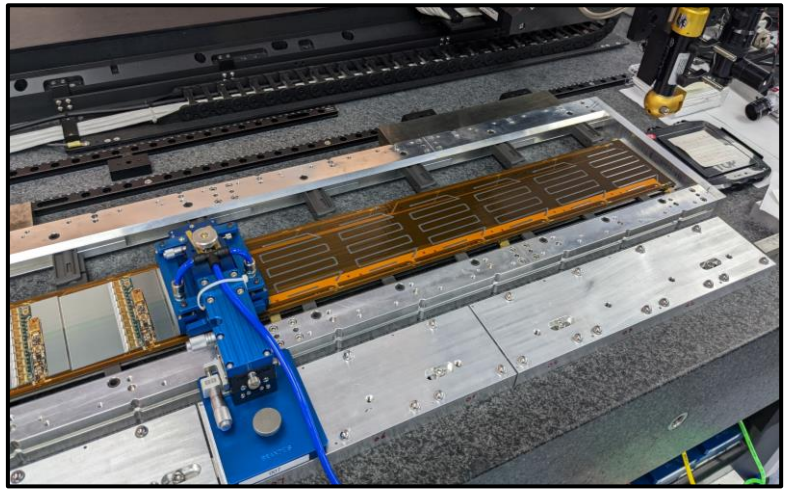
ITk BARREL STAVES ASSEMBLY AT BNL

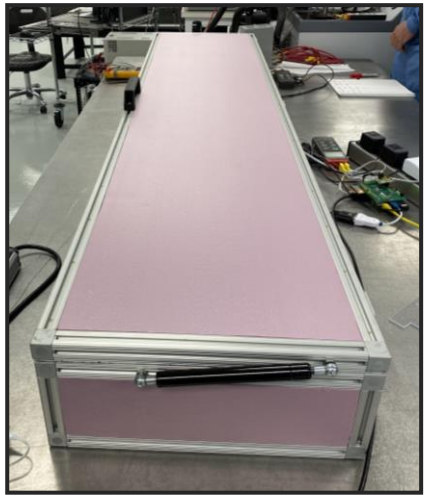
- In the assembly stage, modules are precisely glued on the stave-core while making the electrical connections at the same time.
- The first Pre-Production stave was assembled at BNL with the long strip modules with ABCStarV1.
- Mounting was only done for the side J and the mounting on the side L will be done in May.



Side J of LS stave being assembled at BNL.

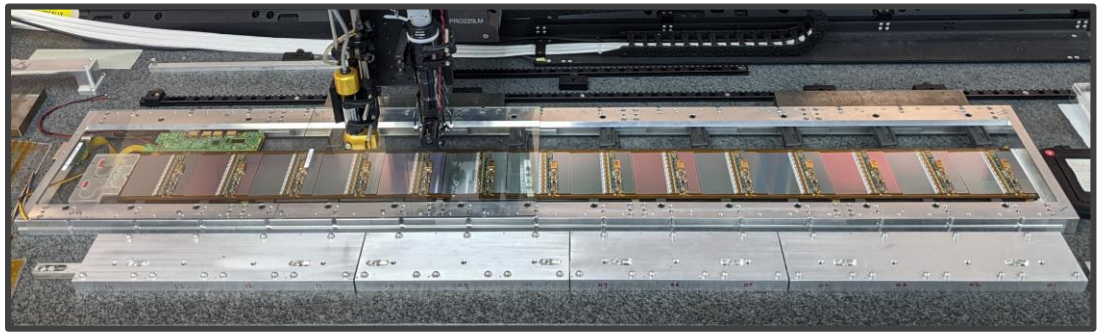
ITk BARREL STAVES TESTING SETUP AT BNL

- The Stave is tested in the coldbox which acts a Faraday cage with Relative Humidity and Temperature control.
- The EoS hosts the **Low Power Giga Bit Transceiver** (lpGBT), a radiation tolerant ASIC that is used to implement multipurpose high speed bidirectional optical links between the DAQ (Genesys or FELIX) and the front-end ASICs.
- The data from the lpGBT is decoded at the DAQ, which is then passed on to the DAQ software(ITSDAQ or YARR) for analysis



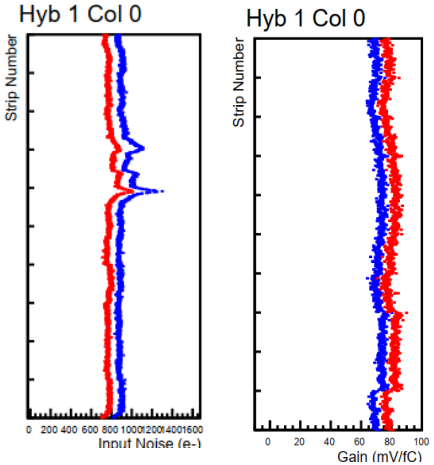
Stave Coldbox

ITk BARREL STAVES TESTING AT BNL



Electrical stave built at BNL in the early 2022 with only side J loaded

- The stave was tested at T=20C and T=-26C (temperature of the coolant at stave inlet) and V bias of -400V.
- Uniform noise performance was observed for all the modules on the side J and the testing setup did not add any additional noise.



Input Noise and gain from one of the 14 hybrids

- The noise performance over the modules on the side J was uniform. No anomalous behavior was observed.
- The side J of the stave is loaded for now, the slave side will be loaded in May 2022.
- Once finished the stave will be shipped to CERN for further testing.

ATLAS EXPERIMENT

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