

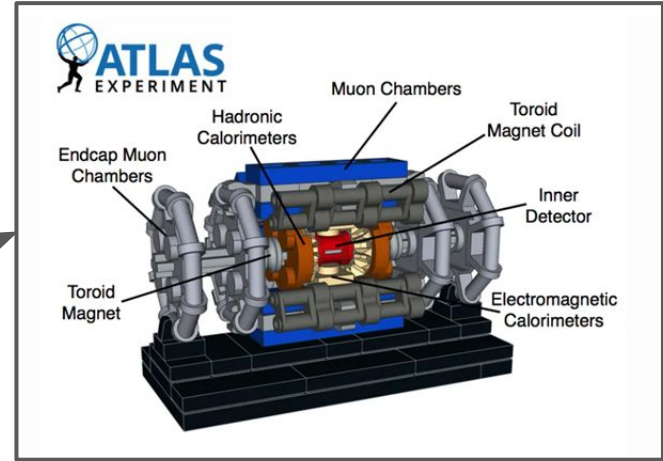
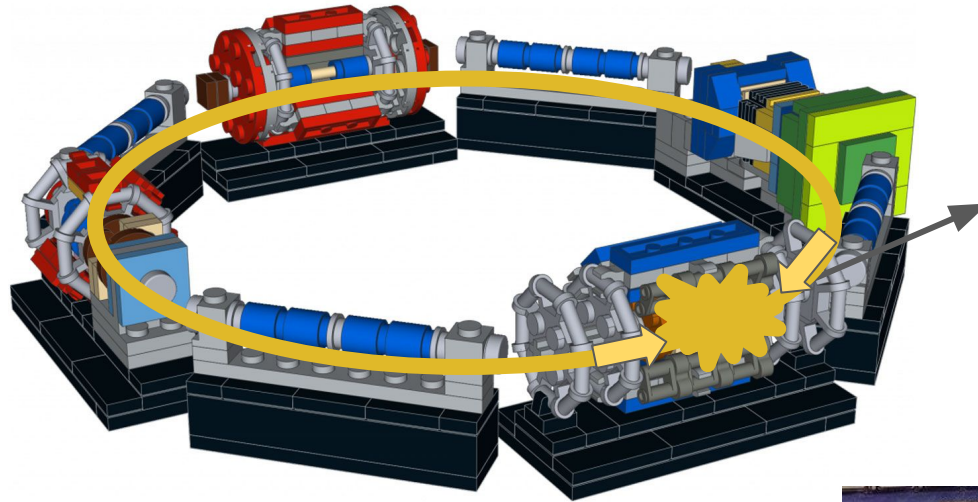
# Explaining the **ATLAS** Upgrade to Santa

PPD Away Day, 2nd Dec '24

Debra Dewhurst on behalf of the ATLAS group



# High Luminosity LHC



Current LHC

High Luminosity LHC



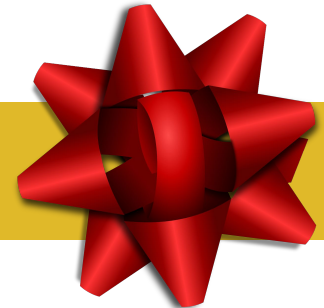
# ATLAS Upgrade



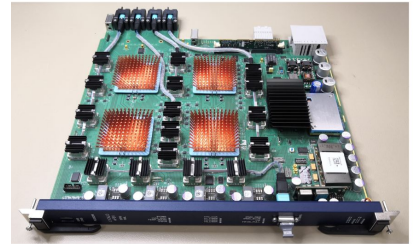
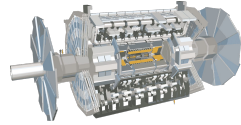
With  from



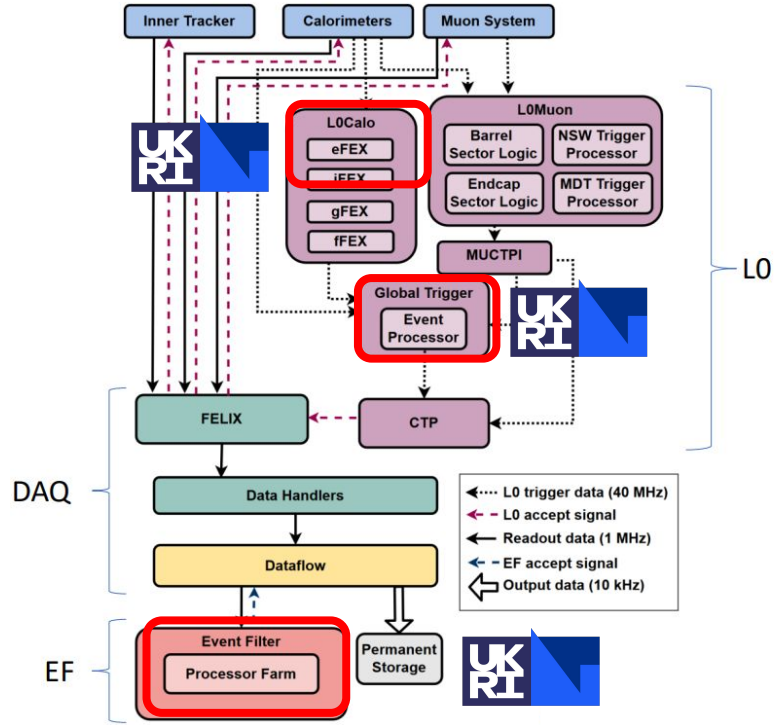
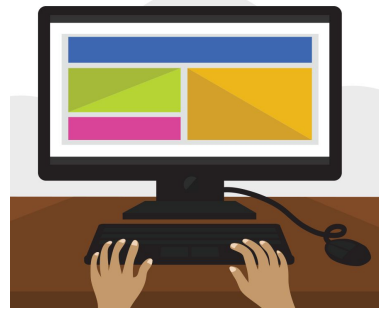
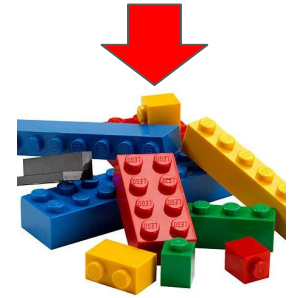
Science and  
Technology  
Facilities Council



# Trigger and Data Acquisition Upgrade

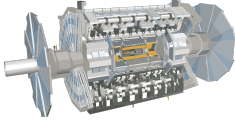


eFEX modules manufactured and tested at RAL

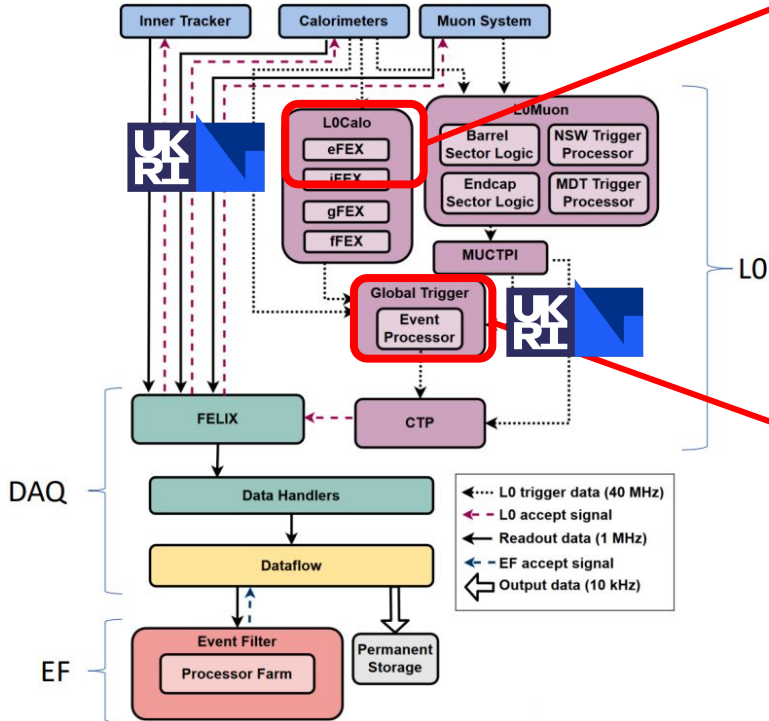




# L1Calo Group



Looks for patterns of energy deposits in the calorimeter characteristic of electrons and taus.  
RAL involved in updates for upgrade



New hardware trigger for the upgrade. RAL playing lead role in design and testing

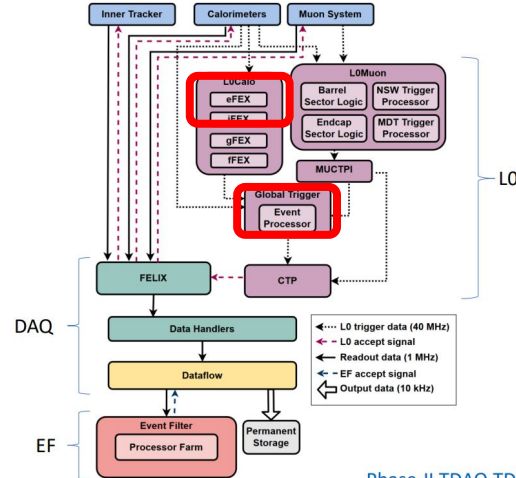


Global common module

# L1Calo Group



One of the group's long serving elves retired. Thank you Dave Sankey for all your work



Phase-II TDAQ TDR

## WISHLIST

- Successful slice test of 5 prototype modules
- Solution to communication problem
- Critical role of RAL in Global, would need more elves, unfreeze of elf recruitment

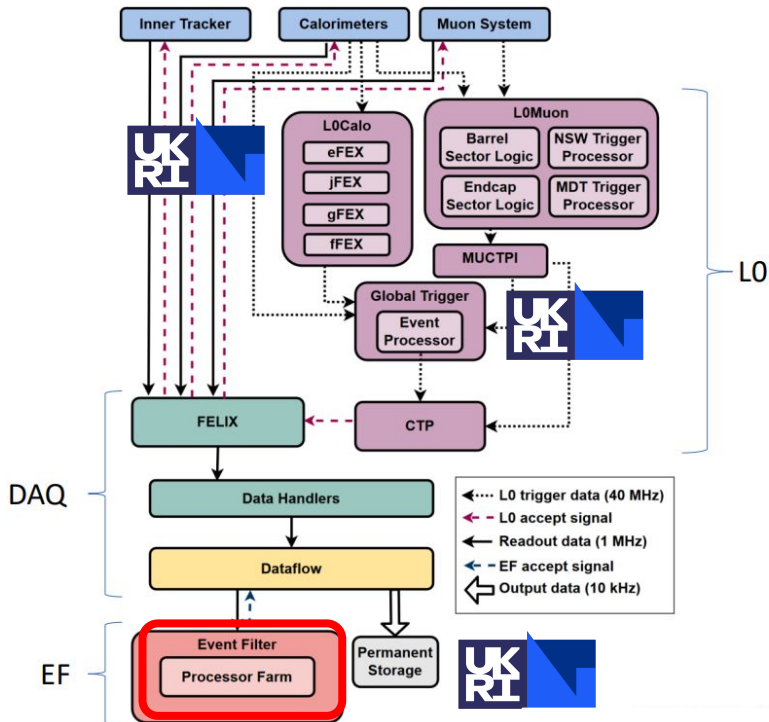
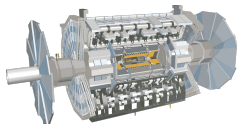


Technology





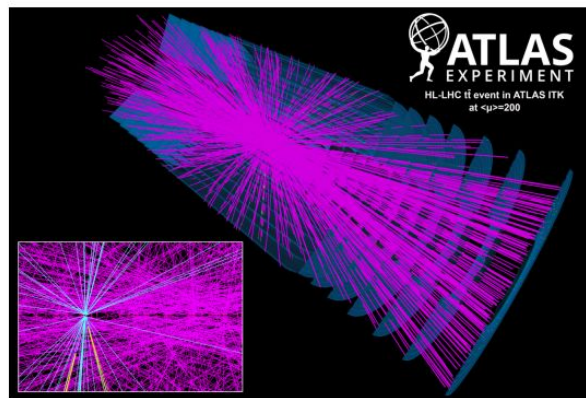
# High Level Trigger Group



One of the group's long serving elves retired. Thank you John Baines for all your work



Stewart elf HLT Upgrade Work Package Leader



# High Level Trigger Group

Software based trigger but needs good hardware to run fast and efficiently. Options being investigated:

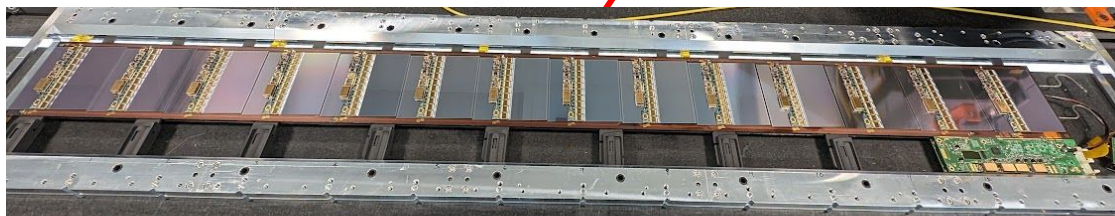
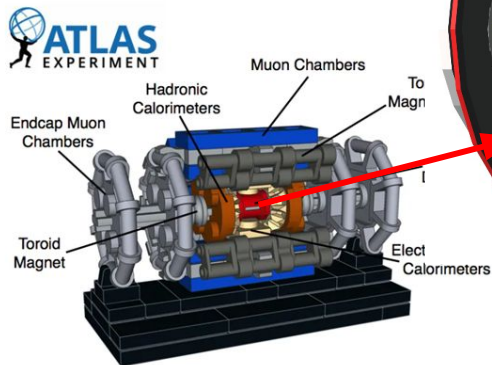
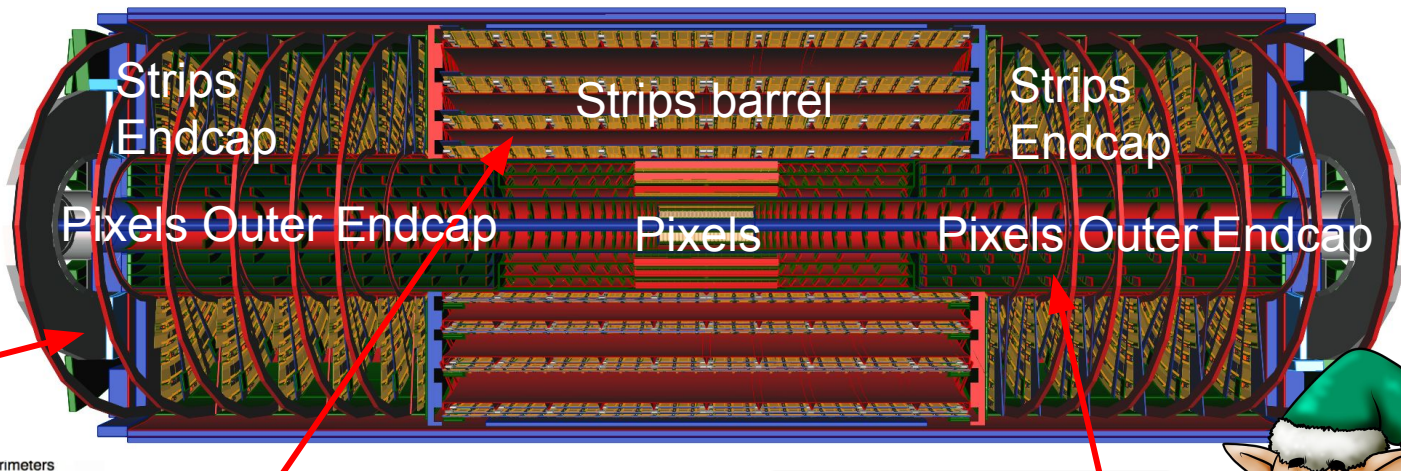


Hardware decision to be made Dec '25

Accelerator options



# Inner Tracking Detector (ITk)



RAL is one of 2 sites loading strip modules onto carbon fibre staves to make the barrel (~200 staves per site)



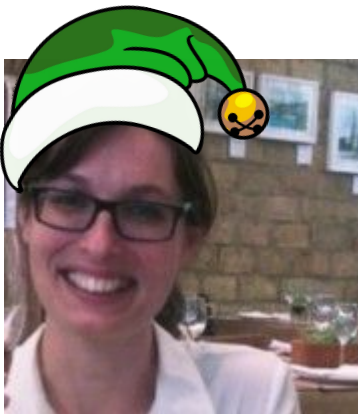
RAL is one of 4 sites loading pixel modules onto 3 sizes of half-ring structures



# Inner Tracking Detector (ITk)

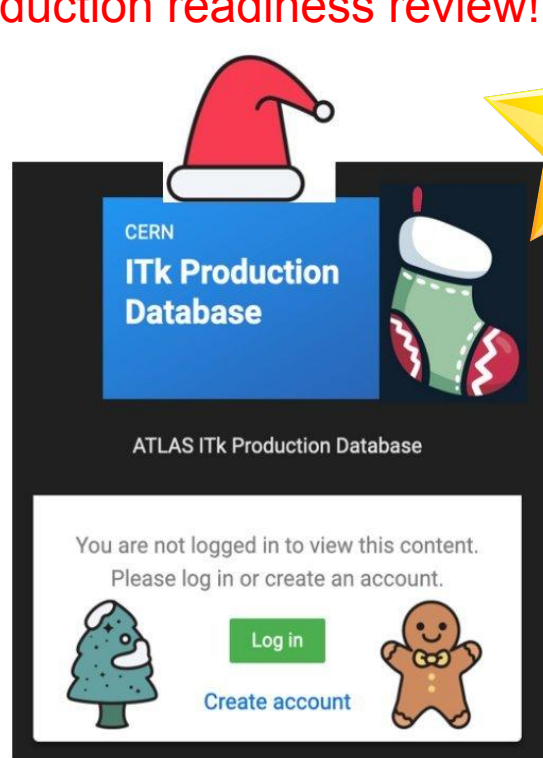


New elves joined the ITk team!



One elf returned to us after being interim Santa

Production database passed its production readiness review!

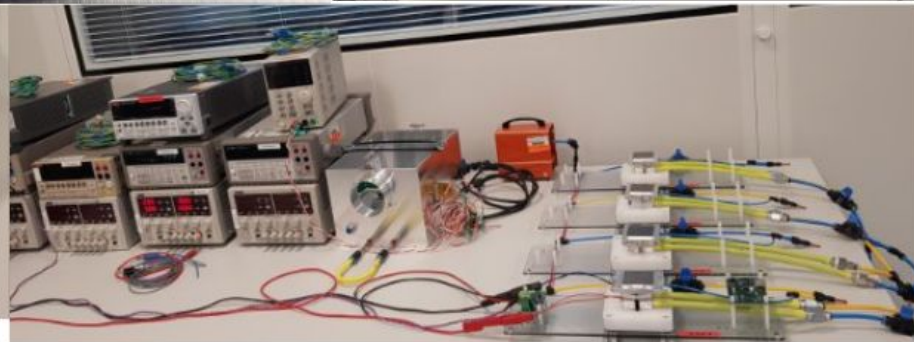
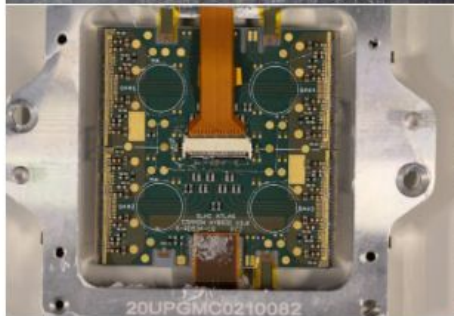
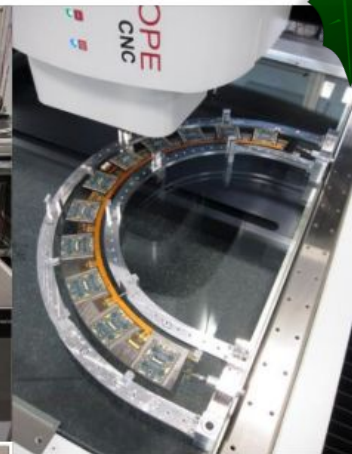
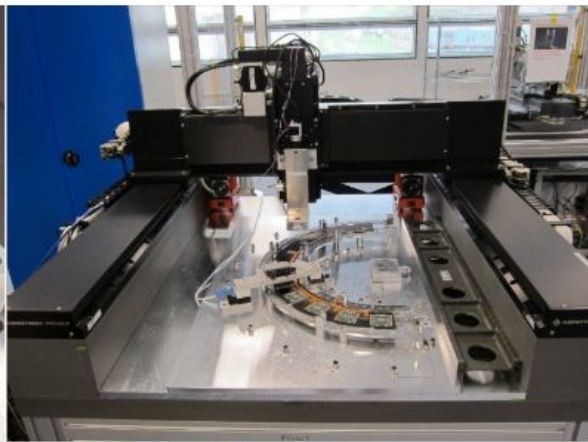
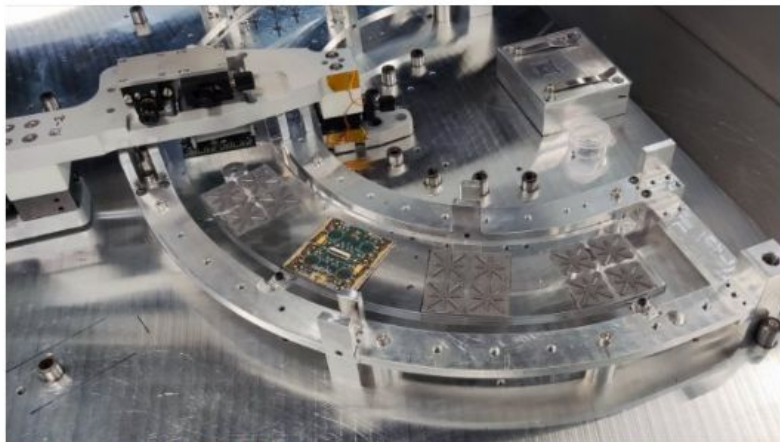




# ITk Pixels



Pixel elves have been busy, lots of progress on testing and assembly setups!



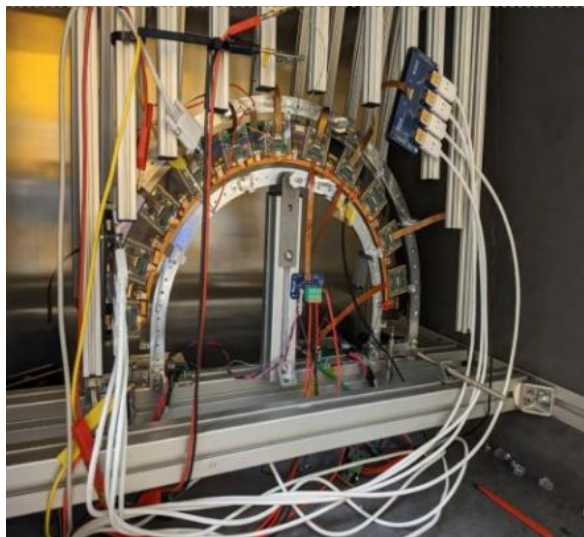
Top: glue deposition on half-ring structure, placement of module and metrology.

Bottom: pixel module and the setup used to do readout tests on it.



# ITk Pixels

HAPPY★NEW★YEAR



Assemble next half ring  
for tests at CERN



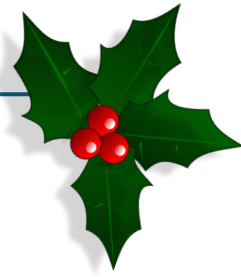
More practice with  
real components



Test half-rings in  
environmental  
chamber with CO<sub>2</sub>  
cooling



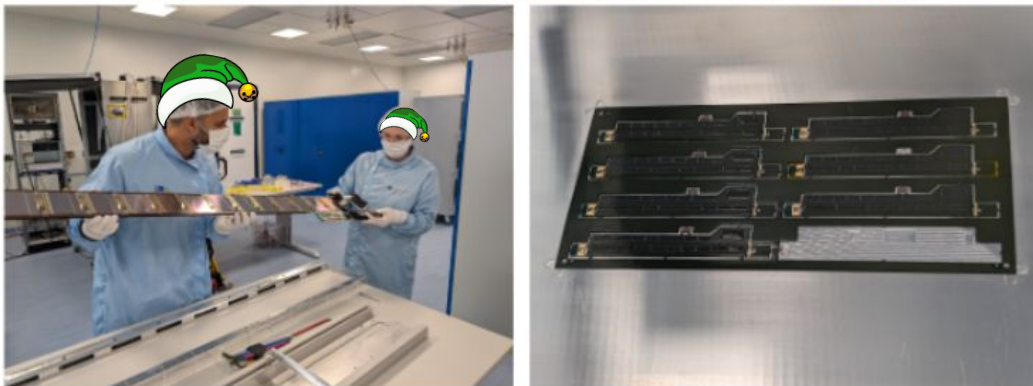
# ITk Strips



Strips elves, with our friends in TD, have been very busy. Passed site qualification for module testing and loading. Lots of modules made and loaded to investigate sensor cracking.



First ever stave with new interposer modules built and tested at RAL showing cracking solution works!



# ITk Strips



## WISHLIST

- Pass reviews needed to start production
- Solution to IpGBT issue affecting a number of experiments
- Start production!
- Continued employment for elves

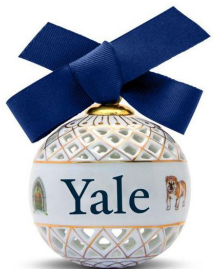
## NEW YEAR'S Resolutions

- 10 staves to build and test
- Making processes efficient
- Welcoming new colleagues from Chile and IHEP in China





# ~~Summary~~



BERA Store