

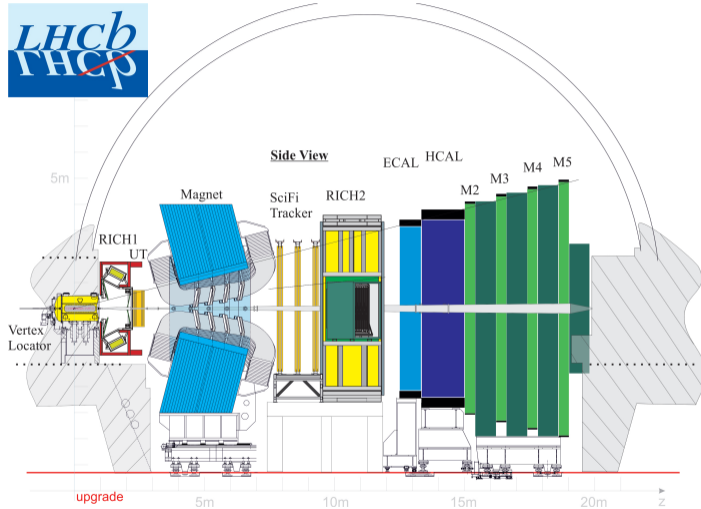
## Introducing the LHCb Team

Kristof De Bruyn

Nikhef Jamboree  
Felix Meritis – May 16th, 2023



# The LHCb Detector

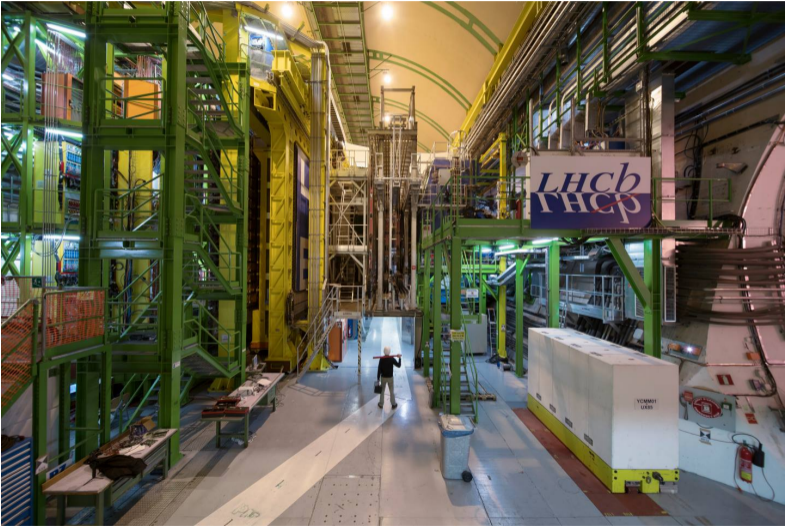


## Physics Programme

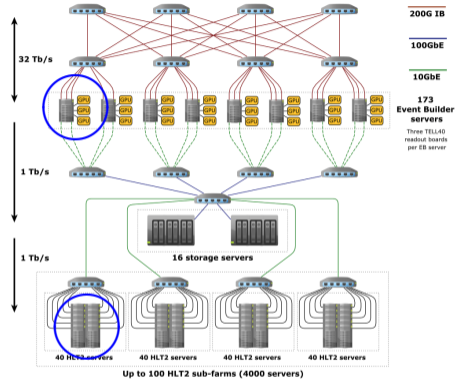
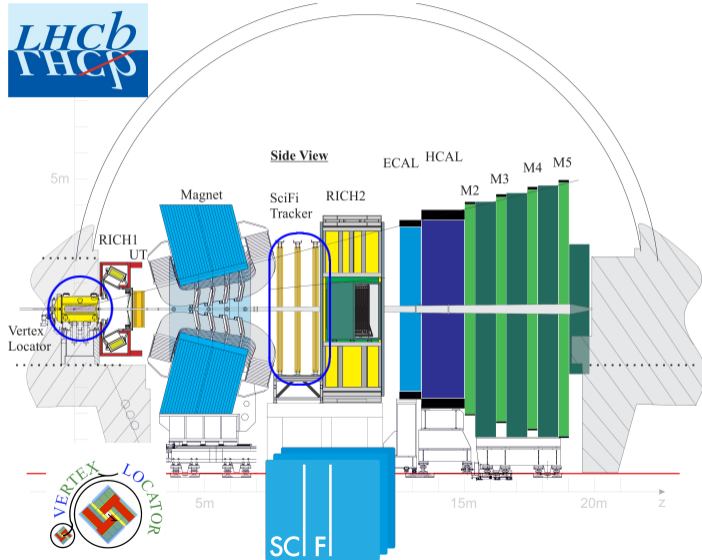
- ▶ CP Violation
- ▶ Rare Decays
- ▶ Forward EW Physics
- ▶ Spectroscopy
- ▶ Central Exclusive Production
- ▶  $p+p$ ,  $p+Pb$ ,  $Pb+Pb$ ,  $p+Ne$ ,  $p+Ar$
- ▶ ...

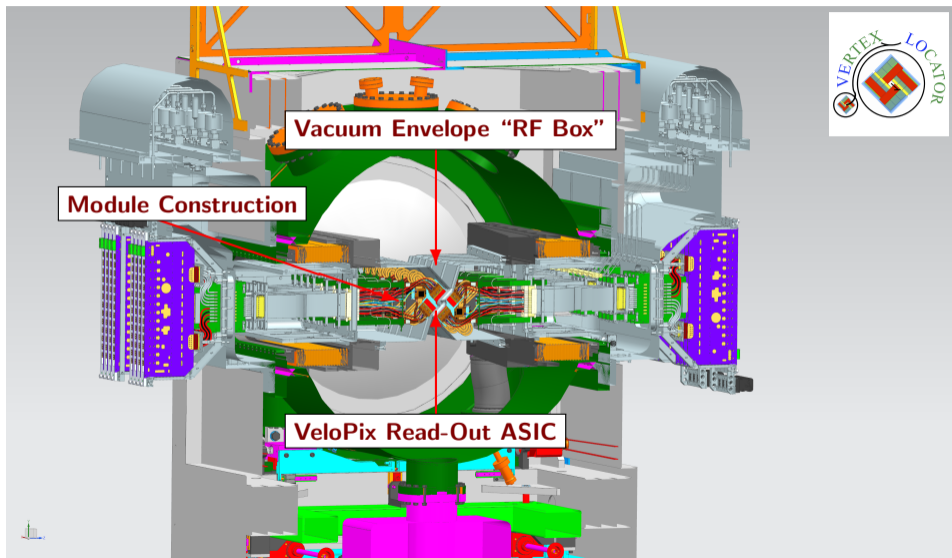
Forward arm spectrometer to study b- and c-hadron decays

# The LHCb Detector



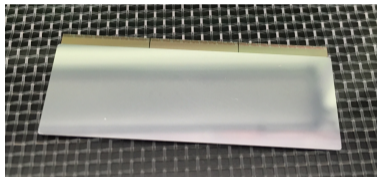
# Where do we contribute?



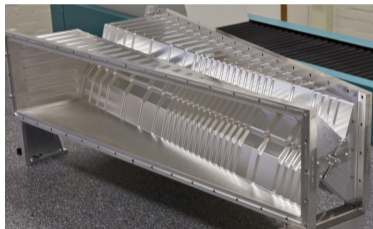


# Our contributions to the Vertex Locator

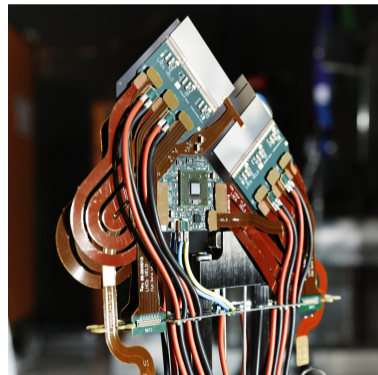
## VeloPix Read-out ASIC



## Vacuum Envelope “RF Box”



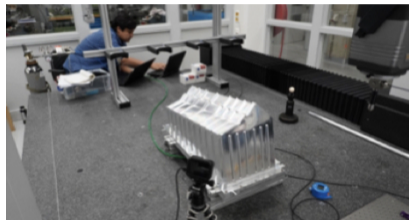
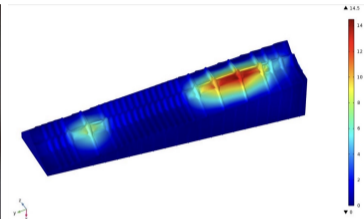
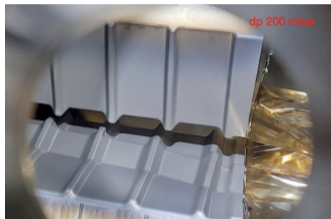
## Module Construction



If you make even the tiniest mistake you can find yourself in terrible trouble



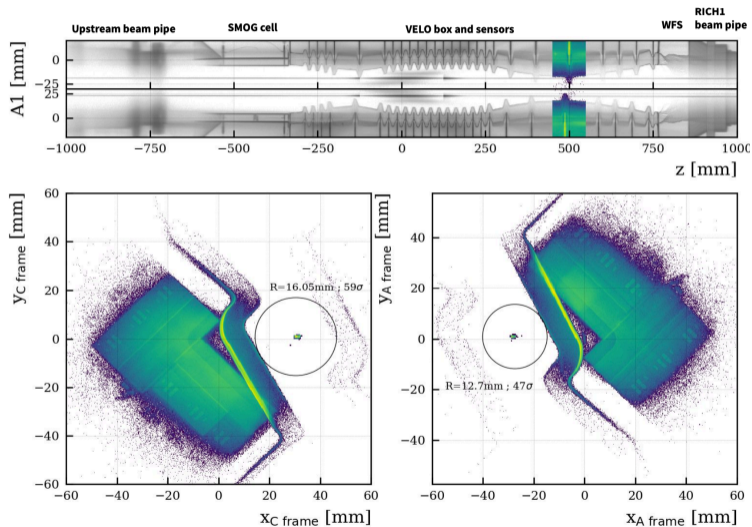
## VELO vacuum incident



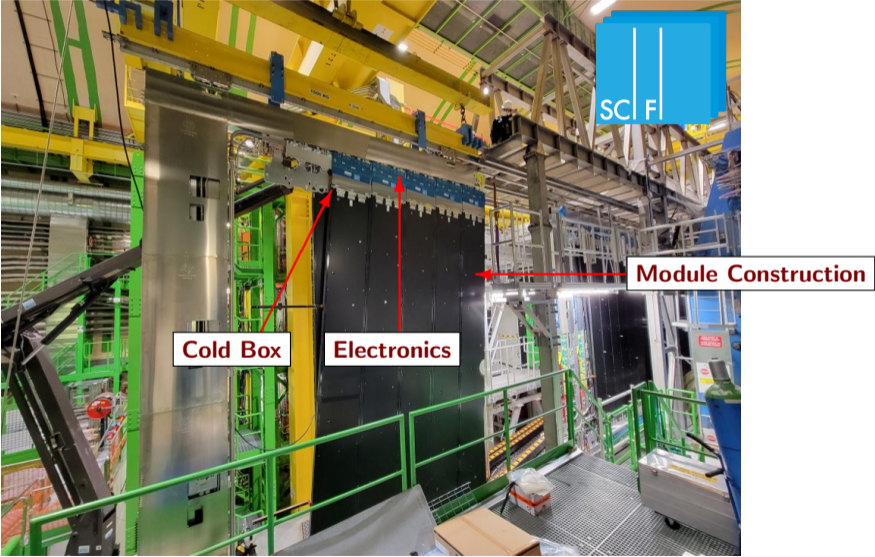
- ▶ What should have been a regular power cut on January 10th ...
- ▶ Accidentally resulted a pressure difference of 200 mbar across a foil of  $200\mu\text{m}$
- ▶ The RF box was plastically deformed up to 14mm
- ▶ ... and will have to be replaced during the 2023 YETS



# Deformation of the RF box

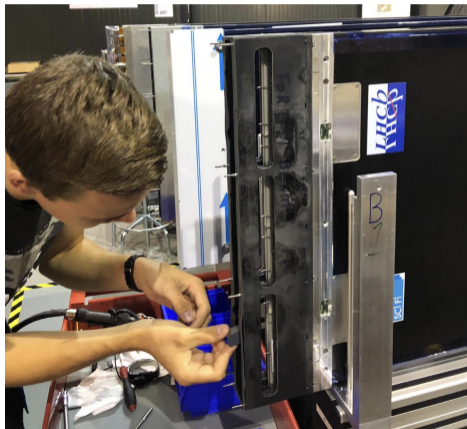


# Scintillating Fibre Detector



# Our contributions to the SciFi Detector

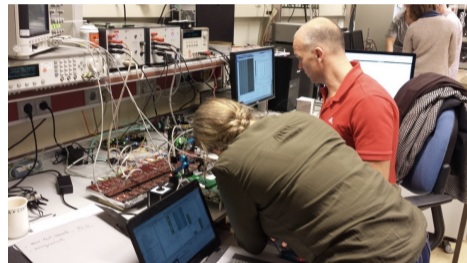
## Cold Box



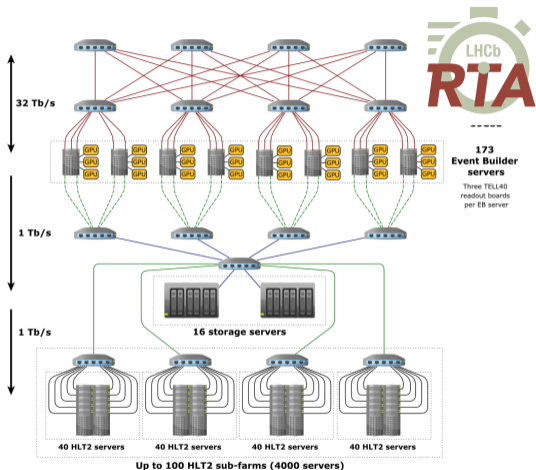
## Module Construction



## Electronics & Control



# Our contributions to the Data Processing



- ▶ Full software trigger of 30MHz proton-proton collisions
- ▶ Framework design of level-1 reconstruction & trigger
- ▶ Implementation of level-1 trigger on GPUs
- ▶ Framework design of level-2 reconstruction & trigger
- ▶ Many, many algorithms

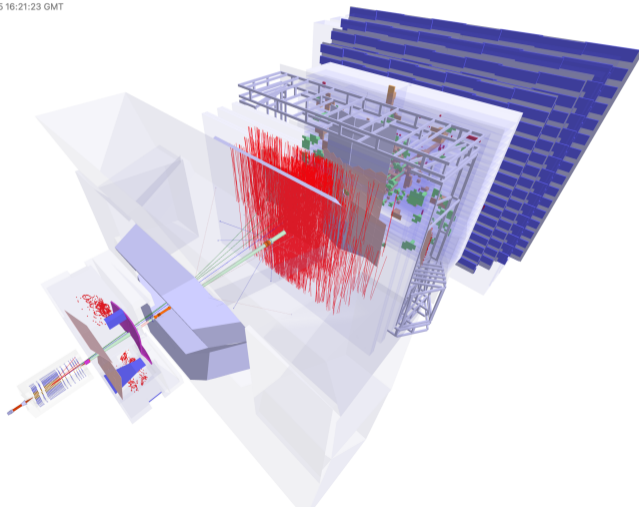
# May 5th: First reconstructed tracks including all subdetectors



LHCb Experiment at CERN

Run / Event: 262544 / 4111064

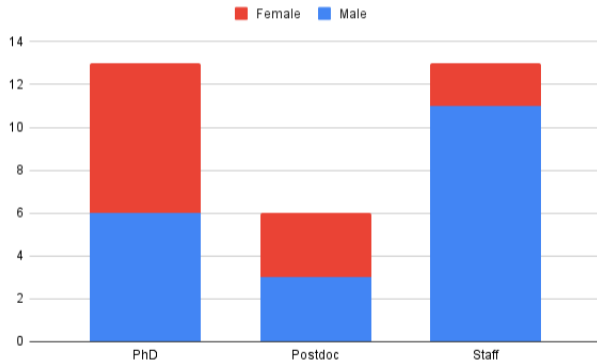
Data recorded: 2023-05-05 16:21:23 GMT



# The LHCb Team



# The LHCb Team





### Daniel Magdalinski



- ▶ Started his PhD Autumn 2022
- ▶ Topic: LHCb software trigger





## Efren Rodriguez Rodriguez



- ▶ PhD student
- ▶ Worked on Timepix4 telescope
- ▶ VELO upgrade 2

## Ganrong Wang



- ▶ PhD student
- ▶ VELO detector optimisation



## Maarten van Veghel



- ▶ Previously: postdoc at RUG
- ▶ Currently: postdoc with PDP group

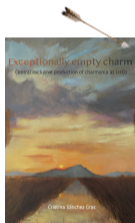
## Gerco Onderwater



- ▶ Previously: Staff at RUG
- ▶ Currently: Staff at UM



## Cristina Sanchez Gras



- ▶ Completed her PhD December 2022
- ▶ Now at AI start-up at Science Park

## Silvia Ferreres Sole



- ▶ Completed her PhD December 2022
- ▶ Now at KPMG Madrid



### Andrea Mauri



- ▶ End of postdoc contract
- ▶ Now at Imperial College London

**Alice Biolchini**



- ▶ Angular analysis in rare beauty decays with electrons

**Davide Nicotra**



- ▶ Trackfinding algorithms for quantum computing