

# Look-see at pilot data for Run 3 at ALICE

Miles Kidson

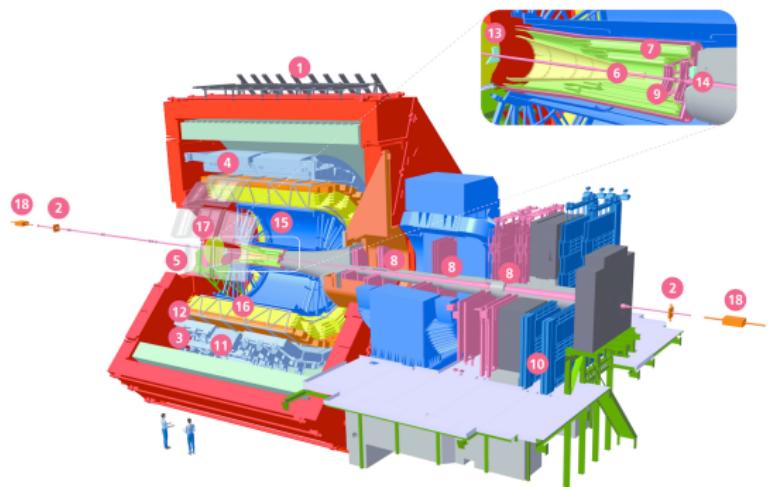
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# ALICE Run 3 Detector Array



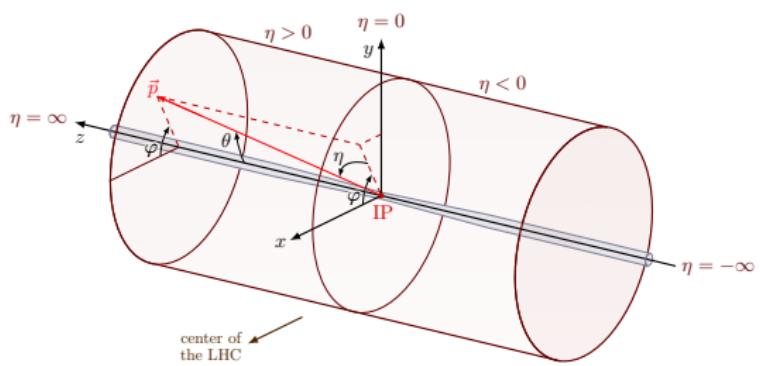
- Configuration of the detector used for Run 3.
- Run 3 added the MFT and upgraded the ITS, as well us upgrading the readout electronics for many detectors.
- The MFT (9), ITS (6, 7), and Muon Spectrometer (8) are of interest to us.



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# Coordinate System

- $\varphi$ : Azimuthal angle around beam axis
- $Z$ : Distance along  $Z$ -axis (cm)
- $\theta$ : Polar angle



- $p_T$ : Transverse momentum ( $\text{GeV}/c$ )

$$p_T = \sqrt{p_x^2 + p_y^2}$$

- $y$ : Rapidity

$$y = \frac{1}{2} \ln \frac{E + p_z}{E - p_z}$$

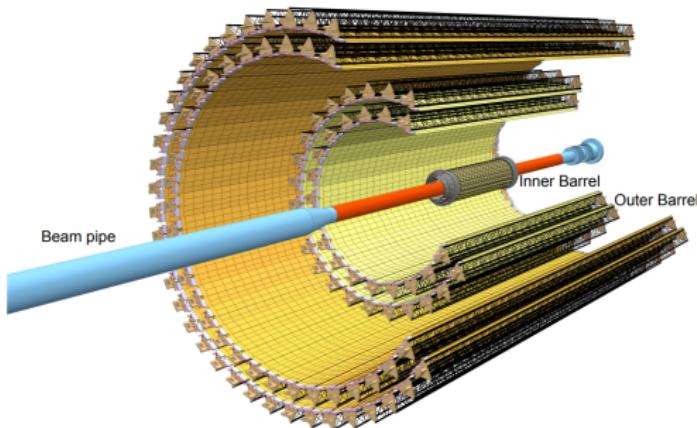
- $\eta$ : Pseudorapidity

$$\eta = -\ln \tan \frac{\theta}{2}$$



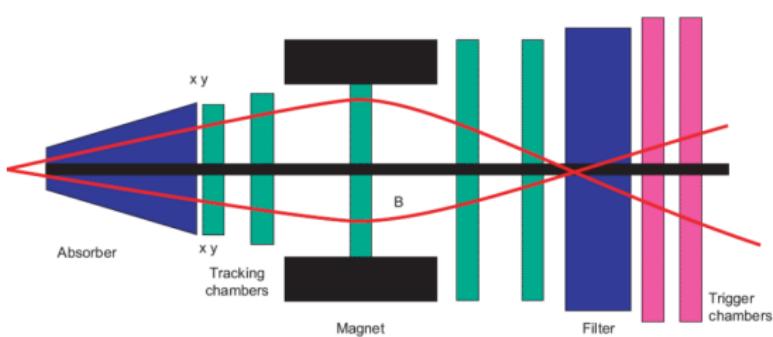
# Inner Tracking System (ITS)

- Upgraded for Run 3
- Innermost layer half the distance from the IP compared to previous ITS
- Si-based tracking detector. Determines primary vertex for an interaction
- 22.4 mm to 391.8 mm radial extension from IP
- Covers  $|\eta| < 1.22$



# Muon Spectrometer

- Used to study heavy quarkonia ( $J/\Psi$ ,  $\Psi'$ ,  $\Upsilon$ ,  $\Upsilon'$ ,  $\Upsilon''$ ) via their  $\mu^+\mu^-$  decay channel,  $Z^0$  bosons via high  $p_T$  dimuon decays, and single muon decays from quarks and  $W^+$  bosons

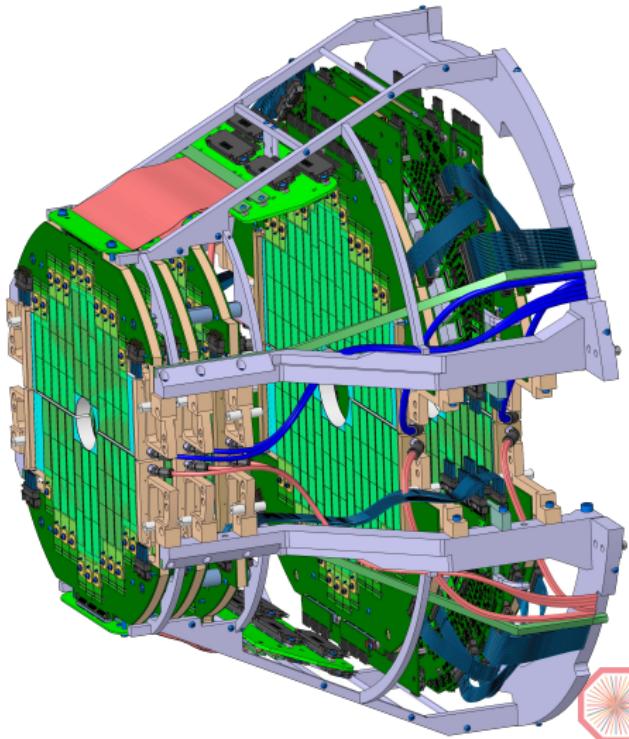


- Covers  $-4 \leq \eta \leq -2.5$
- Outside the range of the ITS so in Run 2 had to perform its own tracking and vertexing
- Run 3 added the MFT before the absorber to fill this role



# Muon Forward Tracker (MFT)

- High resolution Si-based tracking detector added for Run 3
- Uses the same pixel detector technology as the ITS in a better-suited geometry
- Sits before the hadronic absorber, with 5 double-sided layers between  $-46\text{ cm}$  and  $-76.8\text{ cm}$
- Covers  $-3.6 \leq \eta \leq -2.45$



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# Data

- Using pilot beam data from October 2021
- Non-nominal centre of mass energy  $\sqrt{s} = 900 \text{ GeV}$
- Runs 505548 and 505645
- Detectors running: ITS, MCH, MFT, MID, TOF, TPC, TRD

# MFT Kinematics

