



# The Open Data Detector - Tracking System

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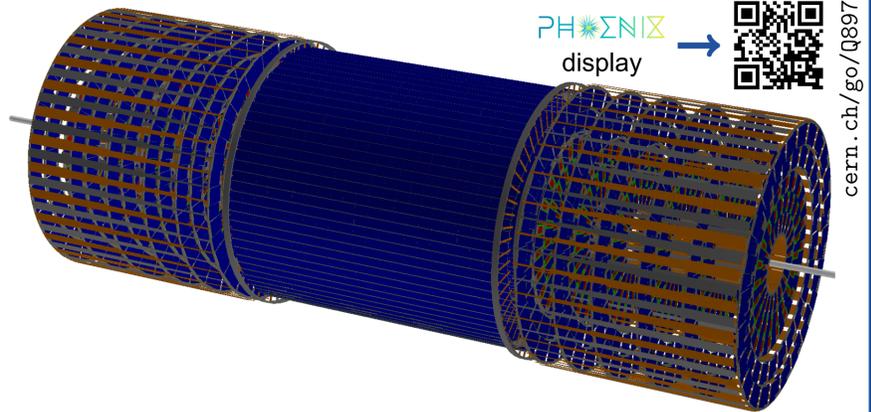


## 3D rendering of the ODD geometry

Open Data Detector is a generic, HL-LHC style tracking detector. The overall goal is to provide an experiment independent detector which can serve as a testbed for R&D on new track reconstruction approaches and optimization of existing ones.

The layout follows the setup of the detector used in the Tracking Machine Learning challenge, and comprises a pixel system, a short- and a long-strip system.

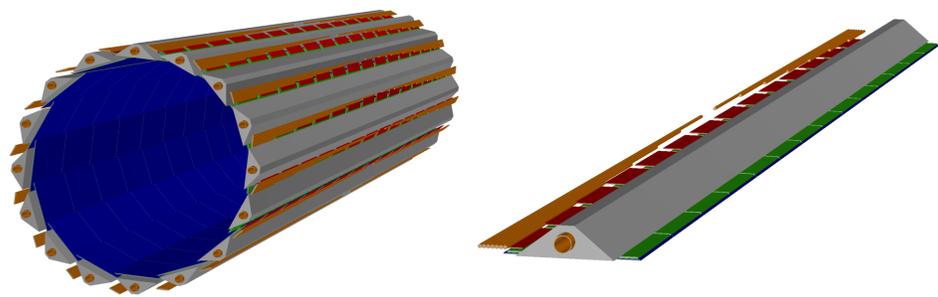
The geometry is implemented using the DD4hep geometry description framework to model a realistic detector geometry including active and passive elements like mounting structure, cables and cooling.



## Pixel

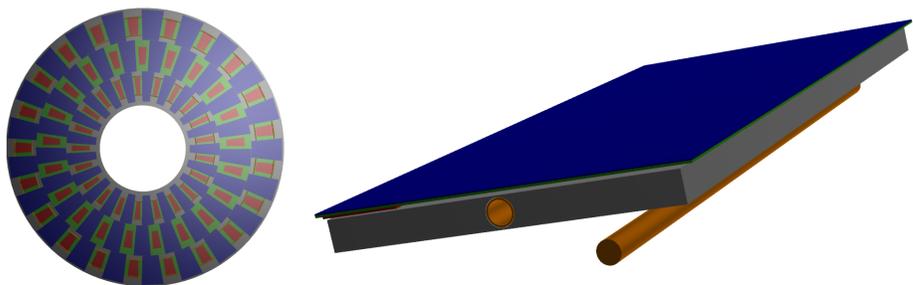
Innermost Pixel barrel layer

Stave with sensors pointing inwards



Pixel sensors placed on staves and surrounded by carbon foam, which wraps a cooling pipe.

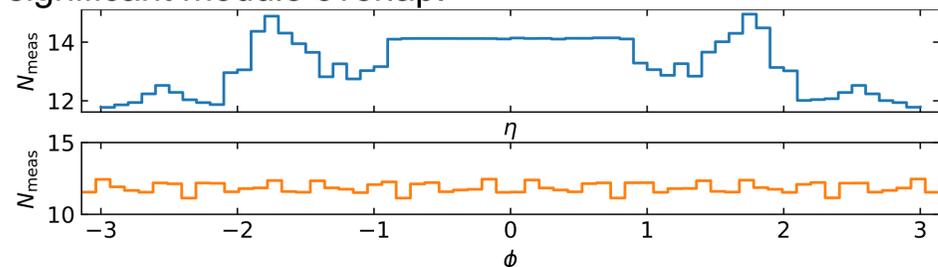
## Strips



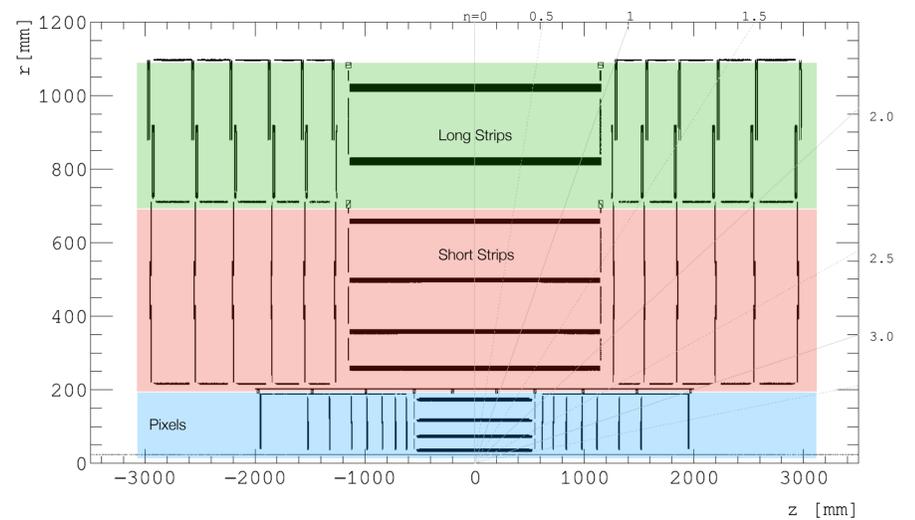
The ODD hosts a short- and a long-strips system. For the long-strips, sensor pairs are rotated with a stereo angle of 40 mrad

## Detector characteristics

The ODD describes a fully hermetic detector with pseudo-rapidity coverage of  $|\eta| < 3$ . At full efficiency, it guarantees at least 12 measurements per track, which is enhanced by significant module overlap.

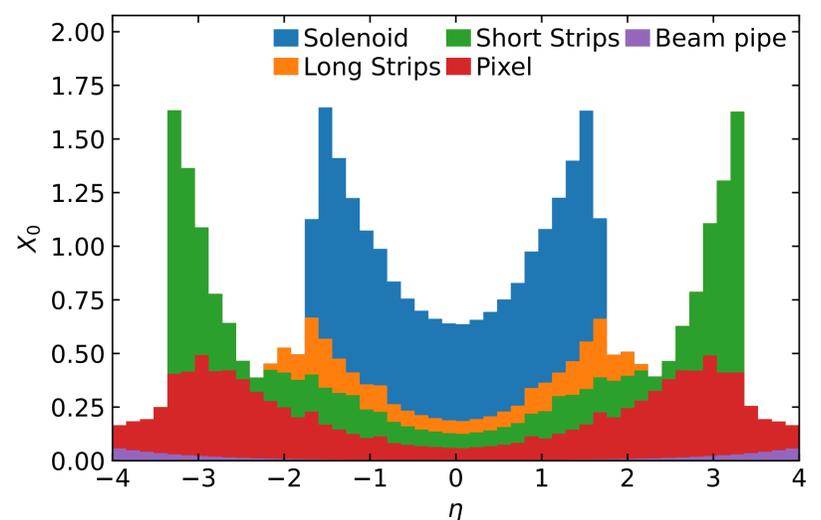


## Sensitive elements in the $rz$ plane



Geant4 hit map showing the sensitive and passive material structures in the ODD in the  $rz$ -plane. The solenoid is omitted in this picture.

## Passive material $X_0$



Passive material of different components of the detector in units of radiation length  $X_0$ . Maximum material is found at about  $1.6X_0$  at about  $|\eta| = 1.5, 3.1$ .

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