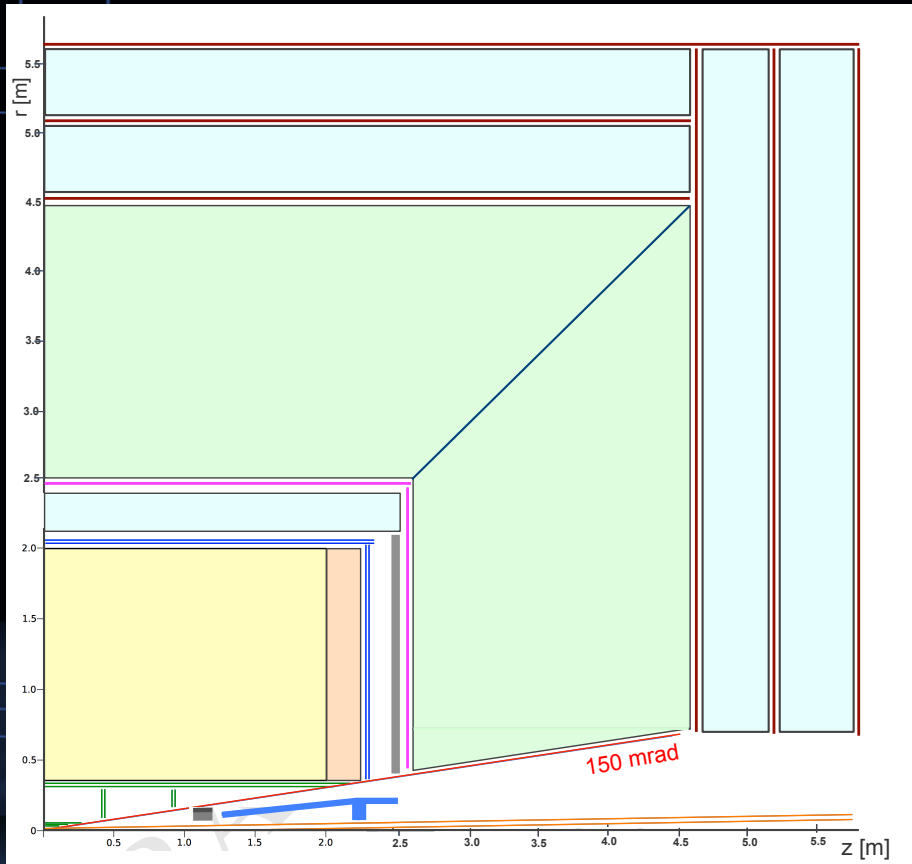


# **IDEA Layout**

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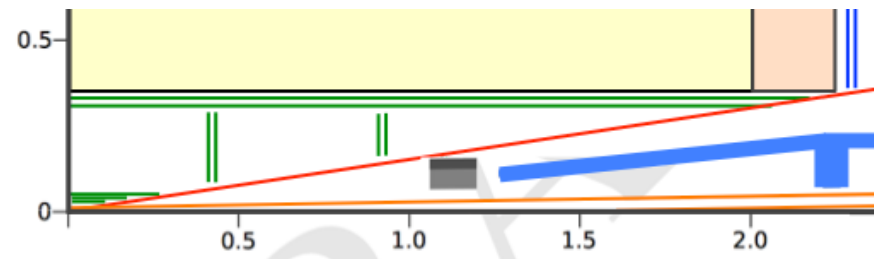
Lecce, 11 ottobre 2018

# IDEA Layout



## LEGENDA

- drift chamber
- drift chamber service area
- magnet and iron return yoke
- calorimeter
- Si pixels 20 $\mu$ m $\times$ 20 $\mu$ m (inner barrel layers)  
50 $\mu$ m $\times$ 1mm (outer barrel layers)  
50 $\mu$ m $\times$ 50 $\mu$ m (forward disks)
- Si strips double stereo layer 50 $\mu$ m $\times$ 10cm
- $\mu$ Rwell double layer 0.4mm $\times$ 50cm
- $\mu$ Rwell double layer 1.5mm $\times$ 50cm
- absorber (lead)
- luminometer
- steel simulating compensating and shielding solenoids
- vacuum tube



# IDEA Layout

## Vertex Detector

Layer	R [mm]	L [mm]	Si eq. thick. [ $\mu\text{m}$ ]	$X_0$ [%]	pixel size [ $\text{mm}^2$ ]	area [ $\text{cm}^2$ ]	# of channels
1	17	$\pm 110$	300	0.3	0.02 $\times$ 0.02	235	60M
2	23	$\pm 150$	300	0.3	0.02 $\times$ 0.02	434	110M
3	31	$\pm 200$	300	0.3	0.02 $\times$ 0.02	780	200M
4	320	$\pm 2110$	450	0.5	0.05 $\times$ 1.0	85K	170M
5	340	$\pm 2245$	450	0.5	0.05 $\times$ 1.0	96K	190M

Disks	$R_{\text{in}}$ [mm]	$R_{\text{out}}$ [mm]	z [mm]	Si eq. thick. [ $\mu\text{m}$ ]	$X_0$ [%]	pixel size [ $\text{mm}^2$ ]	area [ $\text{cm}^2$ ]	# of channels
1	62	300	$\pm 400$	300	0.3	0.05 $\times$ 0.05	5.4K	220M
2	65	300	$\pm 420$	300	0.3	0.05 $\times$ 0.05	5.4K	220M
3	138	300	$\pm 900$	300	0.3	0.05 $\times$ 0.05	4.4K	180M
4	141	300	$\pm 920$	300	0.3	0.05 $\times$ 0.05	4.4K	180M

# IDEA Layout

## Drift Chamber

	$R_{in}$ [mm]	$R_{out}$ [mm]	$z$ [mm]
drift chamber	350	2000	$\pm 2000$
service area	350	2000	$\pm(2000 \div 2250)$

	inner wall	gas	wires	outer wall	service area
thickness [mm]	0.2	1700	1700	20	250
$X_0$ [%]	0.08	0.12	0.22	1.2	4.5

# of layers	112	min 11.8 mm – max 14.9 mm
# of cells	56448	192 at 1 <sup>st</sup> – 816 at last layer
average cell size	13.9 mm	min 11.8 mm – max 14.9 mm
average stereo angle	134 mrad	min 43 mrad – max 223 mrad
transverse resolution	100 $\mu$ m	80 $\mu$ m with cluster timing
longitudinal resolution	750 $\mu$ m	600 $\mu$ m with cluster timing

active volume	50 m <sup>3</sup>	
readout channels	112,896	r.o. from both ends
max drift time	400 ns	800 $\times$ 8 bit at 2 GHz

# IDEA Layout

## Si wrapper

Layer	R [m m]	L [mm]	Si eq. thick. [ $\mu$ m]	$X_0$ [%]	pixel size [mm <sup>2</sup> ]	area [cm <sup>2</sup> ]	# of channels
1	2040	$\pm 2400$	450	0.5	0.05 $\times$ 100	616K	12.3M
2	2060	$\pm 2400$	450	0.5	0.05 $\times$ 100	620K	12.4M

Disks	$R_{in}$ [mm]	$R_{out}$ [mm]	z [mm]	Si eq. thick. [ $\mu$ m]	$X_0$ [%]	pixel size [mm <sup>2</sup> ]	area [cm <sup>2</sup> ]	# of channels
1	350	2020	$\pm 2300$	450	0.5	0.05 $\times$ 100	250K	5M
2	354	2020	$\pm 2320$	450	0.5	0.05 $\times$ 100	250K	5M

# IDEA Layout

## Pre-shower Counter

R [mm]	Length [mm]	Thickness [mm]	pixel size [mm]	area [cm <sup>2</sup> ]	# of channels
2450	±2550	20	0.4×500	785K	392K

R <sub>in</sub> [mm]	R <sub>out</sub> [mm]	z [mm]	Thickness [mm]	pixel size [mm]	area [cm <sup>2</sup> ]	# of channels
390	2430	±2550	20	0.4×500	362K	181K

## Magnet

	R <sub>in</sub> [mm]	R <sub>out</sub> [mm]	z [mm]	X <sub>0</sub> [%]
solenoid	2100	2400	±2500	0.75

## End-plate absorber

	R <sub>in</sub> [mm]	R <sub>out</sub> [mm]	z [mm]	X <sub>0</sub> [%]
lead	380	2090	±(2490÷2495)	0.75

# IDEA Layout

## Calorimeter (lead)

R [mm]	Length [mm]	Thickness [mm]	interaction lengths
2500	$\pm(2600\div 4600)$	2000	8

$R_{in}$ [mm]	$R_{out}$ [mm]	z [mm]	Thickness [mm]	interaction lengths
$\pm(390\div 680)$	$\pm 2500\div 4500$	$\pm(2600\div 4600)$	2000	8

# IDEA Layout

## Muon Detector and return yoke

Layer	R [mm]	Length [mm]	Thickness [mm]	int. length	pixel size [mm]	area [cm <sup>2</sup> ]	# of channels
$\mu$ Rwell	4550	$\pm 4600$	20		1.5 $\times$ 500	2.6M	3.5K
iron	4600	$\pm 4600$	500	2.5			
$\mu$ Rwell	5150	$\pm 4600$	20		1.5 $\times$ 500	3.0M	4.0K
iron	5200	$\pm 4600$	500	2.5			
$\mu$ Rwell	5750	$\pm 5900$	20		1.5 $\times$ 500	4.3M	5.7K

Disk	R <sub>in</sub> [mm]	R <sub>out</sub> [mm]	z [mm]	Thickness [mm]	int. length	pixel size [mm]	area [cm <sup>2</sup> ]	# of channels
$\mu$ Rwell	685	5540	$\pm 4650$	20		1.5 $\times$ 500	1.9M	2.5K
iron	685	5540	$\pm 4540$	500	2.5			
$\mu$ Rwell	685	5540	$\pm 5250$	20		1.5 $\times$ 500	1.9M	2.5K
iron	685	5540	$\pm 5060$	500	2.5			
$\mu$ Rwell	685	5540	$\pm 5560$	20		1.5 $\times$ 500	1.9M	2.5K