

# Planar Silicon Detector Geometry Description

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This document describes the geometry class used to describe a planer silicon strip detector in two dimensions immersed in a magnetic field for measuring the trajectories on charged particles.

## I. INTRODUCTION

The detector consists of a five layer silicon detector immersed in a 1 Tesla magnetic field oriented perpendicular to the measurement directions of the silicon sensors. Measurements are only consider in 2D.

## II. DETECTOR LAYOUT AND PERFORMANCE

The silicon strip sensors are oriented perpendicular to the y axis in the x-z plane in 2 cm intervals. Strips in the sensors run in the z direction. The two inner, lowest y, sensors have strips spaced 25 micron intervals in x. While the 3 outer sensors have strips spaced in 50 micron intervals in x. Each sensor has 2048 strips symmetrically positioned around  $x = 0$ . The magnetic filed is oriented in the z direction such that each sensor makes measurements of the x-y position allowing the curvature in the magnetic field to be measured.

The sensors digitize approximately 32 ADC counts of charge per charged particle hit and have a hit resolution given in microns which is due to digitization and intrinsic resolution uncertainties.

The sensors are described by yposition, stripPtich, number of strips and resolution as give in table I

## III. CLASS DESCRIPTION

The detector geometry is available through the detectorGeometry class described in the detectorGeometry.cc and detectorGeomery.hh classes.

Class variables:

- int nSensors: number for sensors in y
- double bField: magnetic field strength, oriented along z-axis
- sensorDecriptor structs: describing silicon sensors

sensorDecriptor struct:

Instances sensor0, sensor1, sensor2, sensor3, sensor4.

Variables:

- int nStrips
- double stripPitch

TABLE I: Sensor properties.

Layer	Number Strips	Strip Pitch (um)	Y Pos (cm)	Res (um)
0	2048	25	2.0	7
2	2048	25	4.0	7
3	2048	50	6.0	12
4	2048	50	8.0	12
5	2048	50	10.0	12

- double yPos
- double resolution