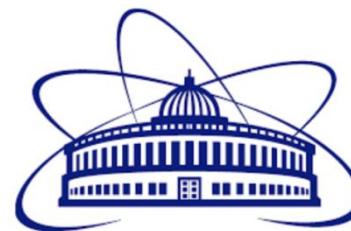


# Simulation framework for SPD experiment

A. Gribowski, A. Ivanov, A.Tkachenko

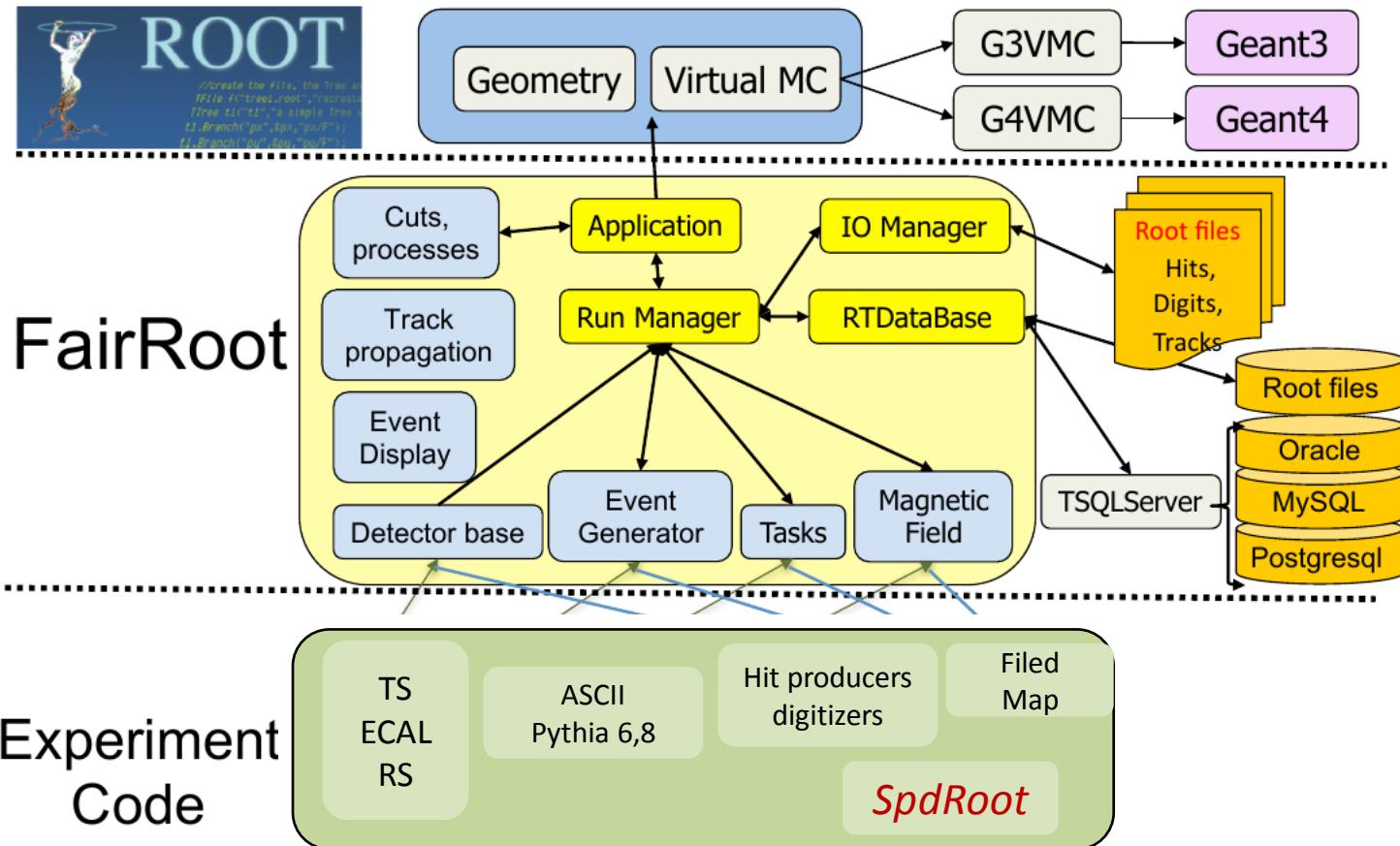
JINR, Dubna



Joint Institute for Nuclear Research  
(Dubna, Russia)

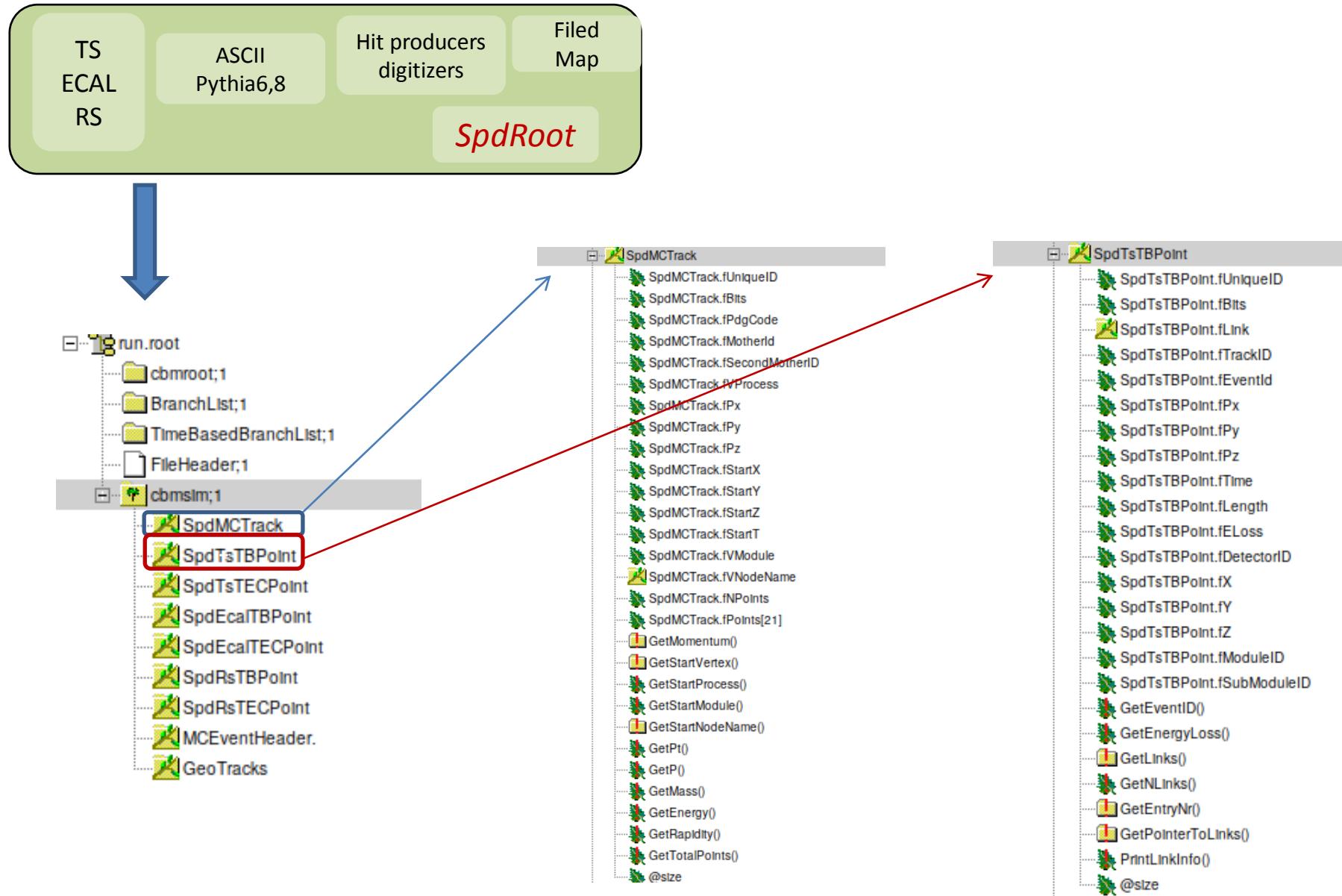
Charles University, Prague, 12 July 2018

# Simulation framework



In the details the FairRoot was discussed in the talk by Oleg Rogachevskiy 11/07/2018

# Simulation framework



# *SpdRoot: Set-up*

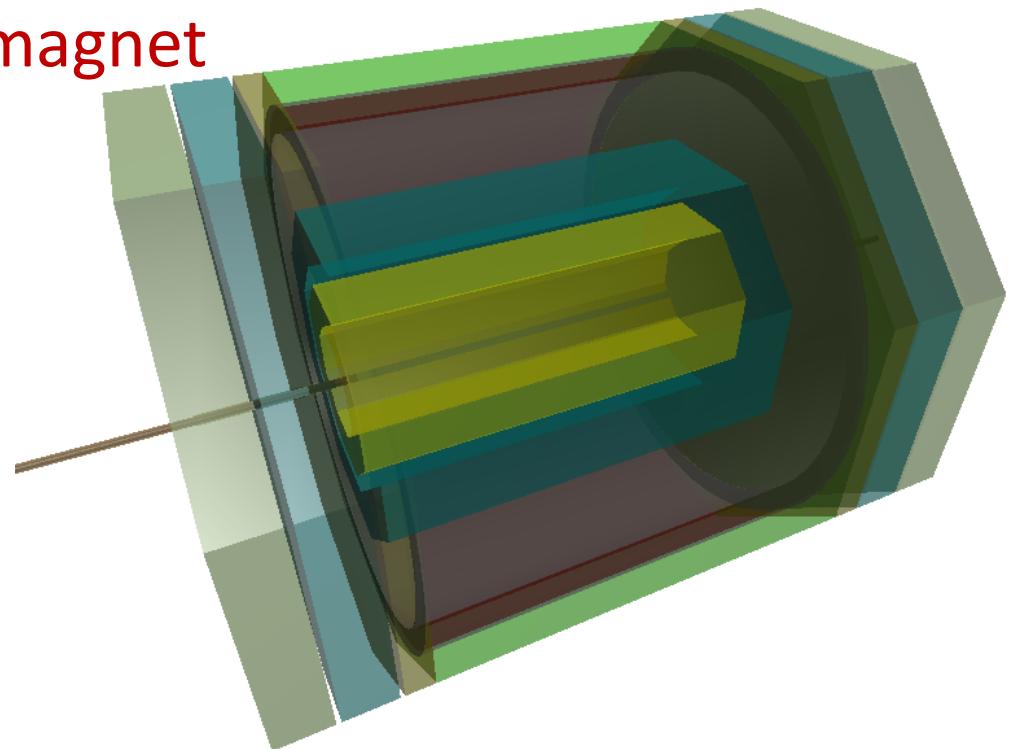
Range system

ECAL

Tracking system

MAGNET elements

Solenoid magnet



# SpdRoot: Set-up

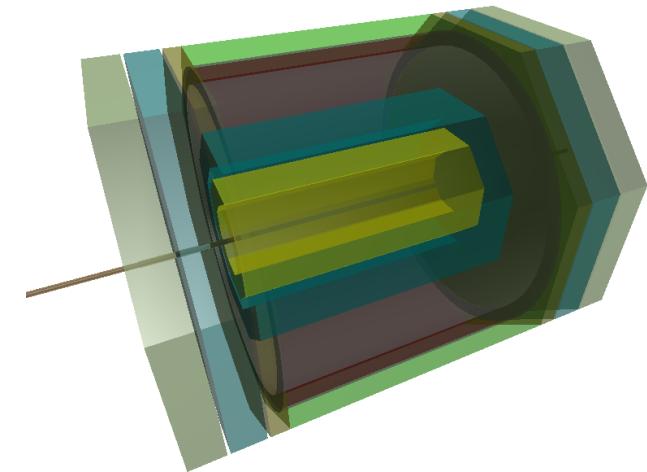
Range system

ECAL

Tracking system

MAGNET elements

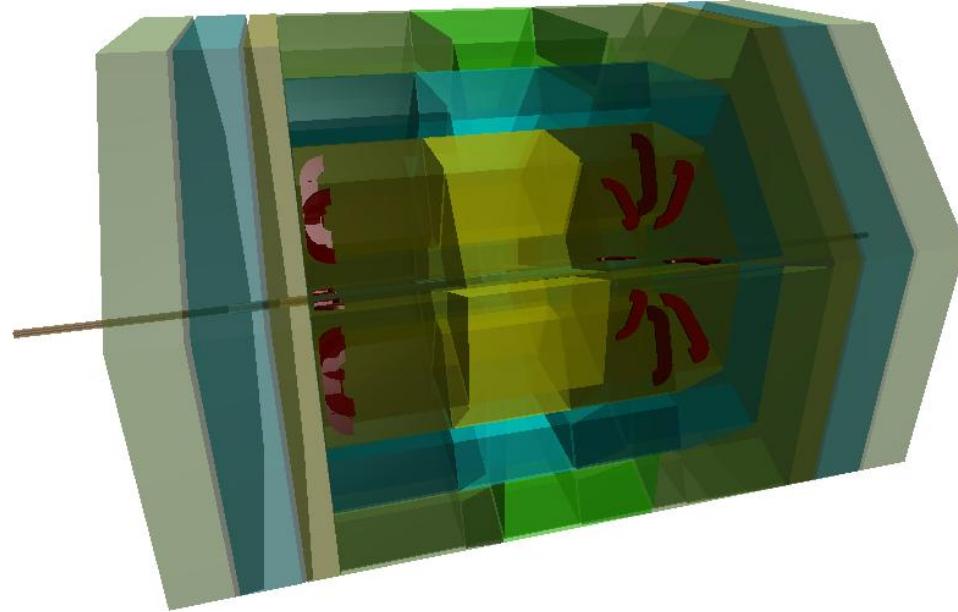
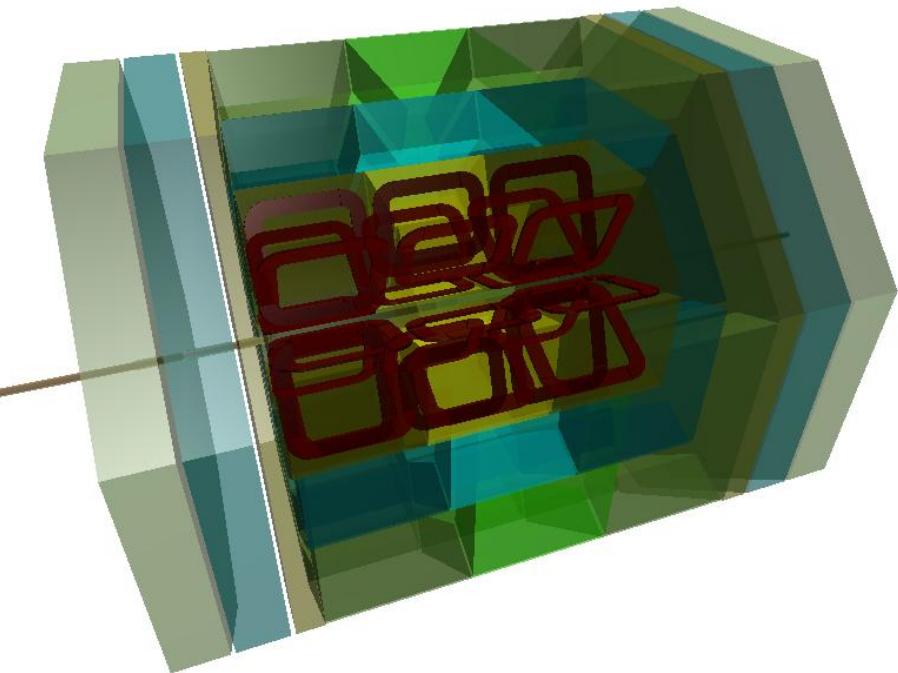
Solenoid magnet



Version 1

Toroid magnet

Version 2



# *SpdRoot: Set-up*

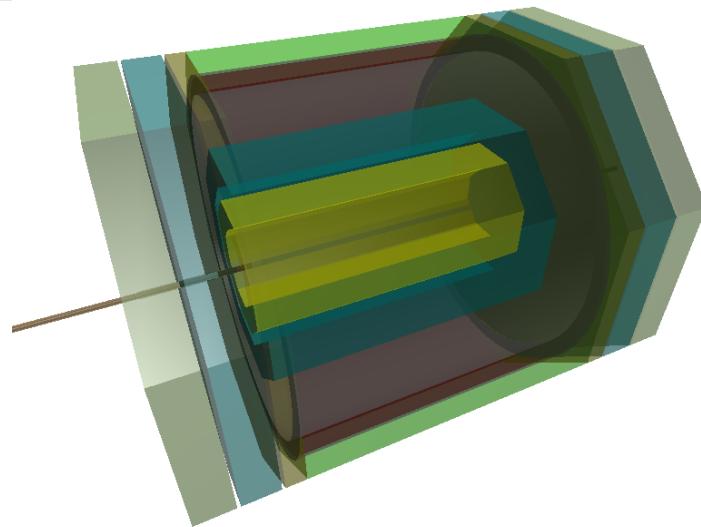
Range system

ECAL

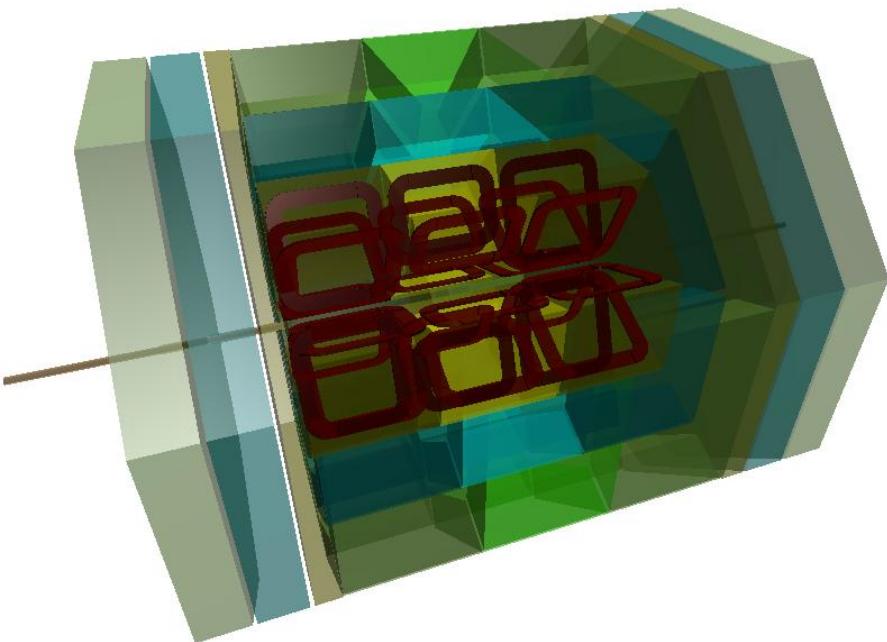
Tracking system

MAGNET elements

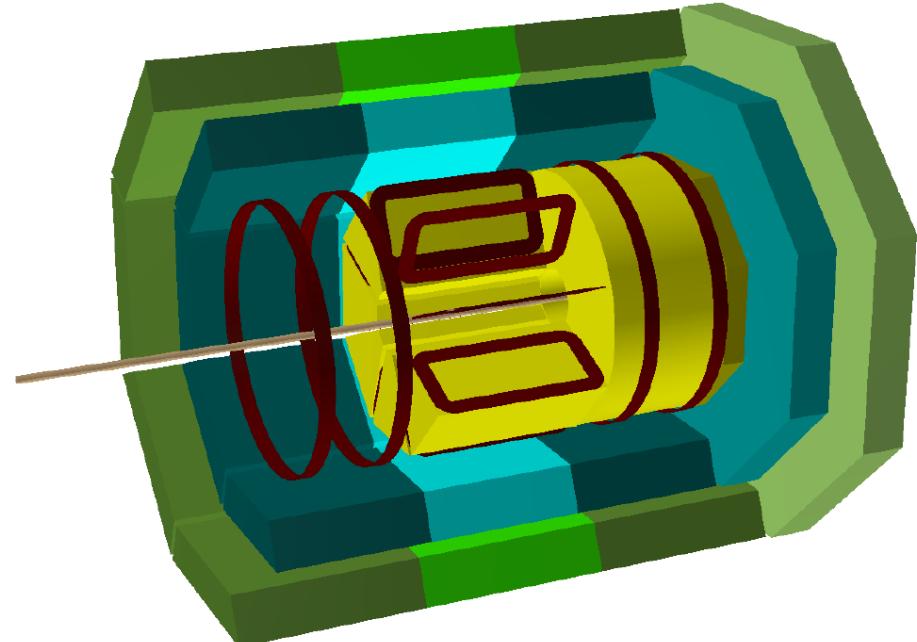
Solenoid magnet



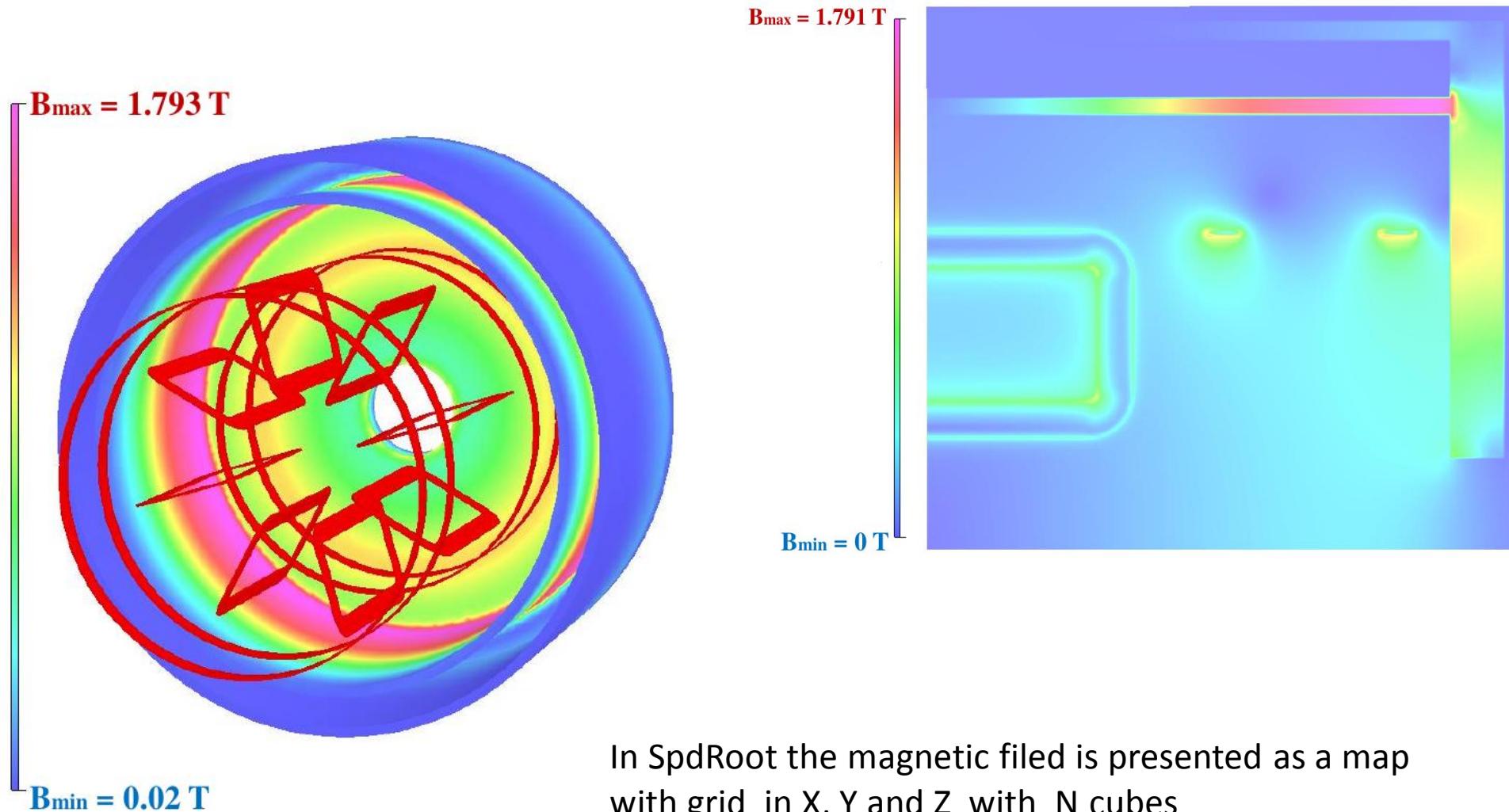
Toroid magnet



Hybrid magnet



# *SpdRoot: Magnetic field for Hybrid system*



In SpdRoot the magnetic filed is presented as a map with grid in X, Y and Z with N cubes

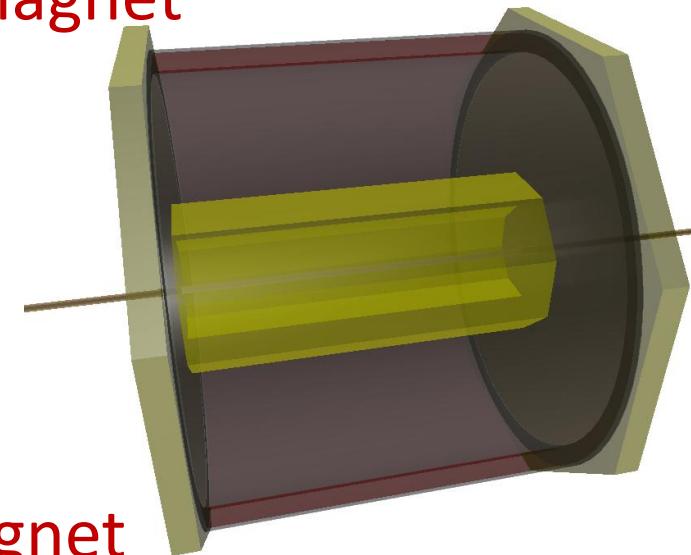
In the details the magnet system was discussed in the talk by Alexander Kovalenko 10/07/2018

# *SpdRoot*: Tracking system

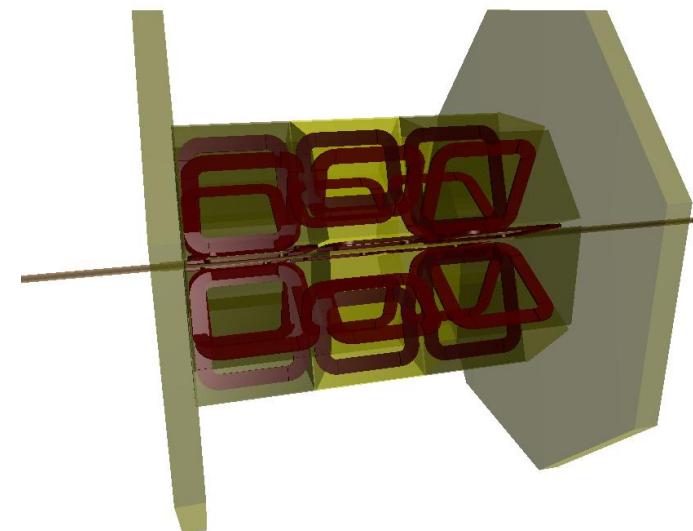
Hybrid magnet

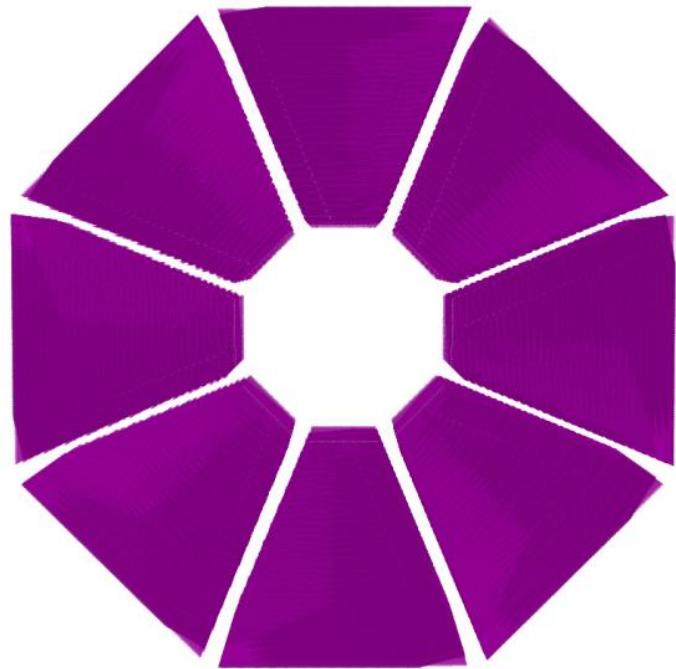


Solenoid magnet



Toroid magnet





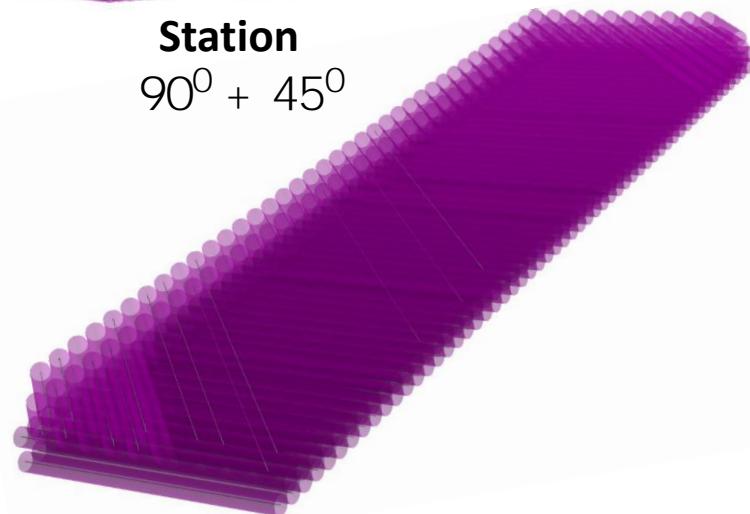
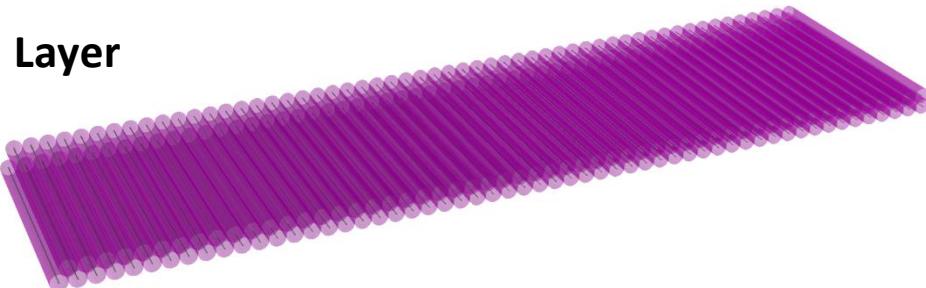
STRAW

Module



Station  
 $90^0 + 45^0$

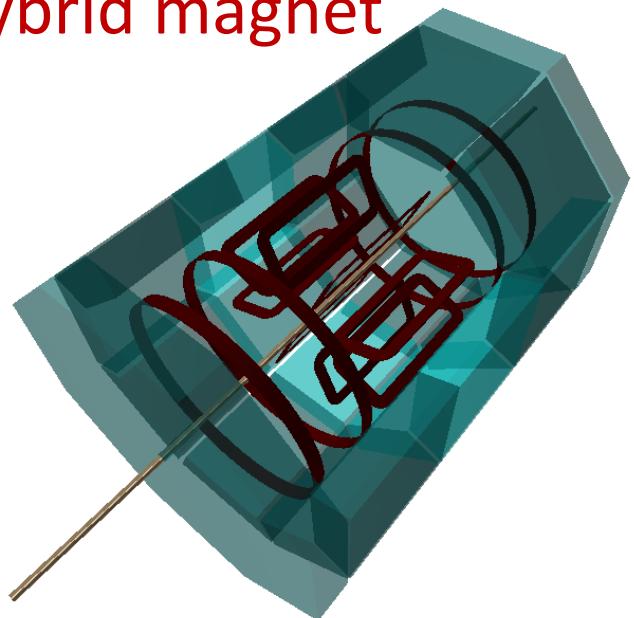
Layer



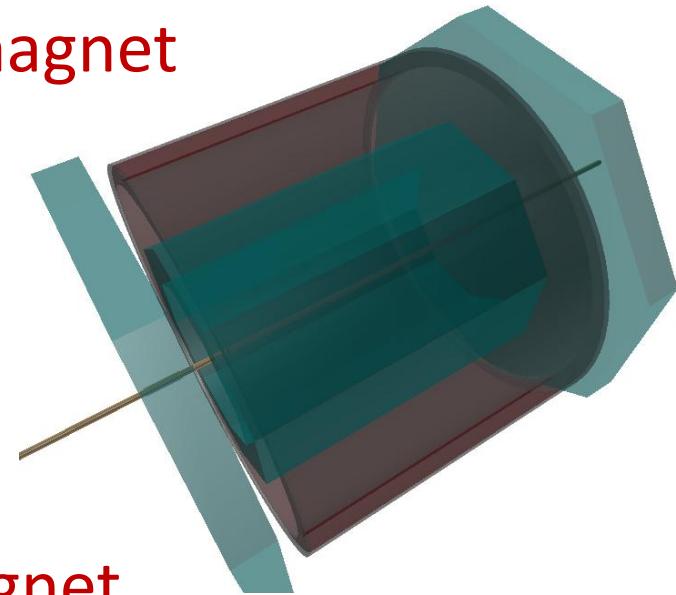
**One of the main goal of the coordinate system is to reduce the background to DY from the decays of the pions**

In the details the STRAW for SPD was discussed in the talk by Temur Enik 11/07/2018

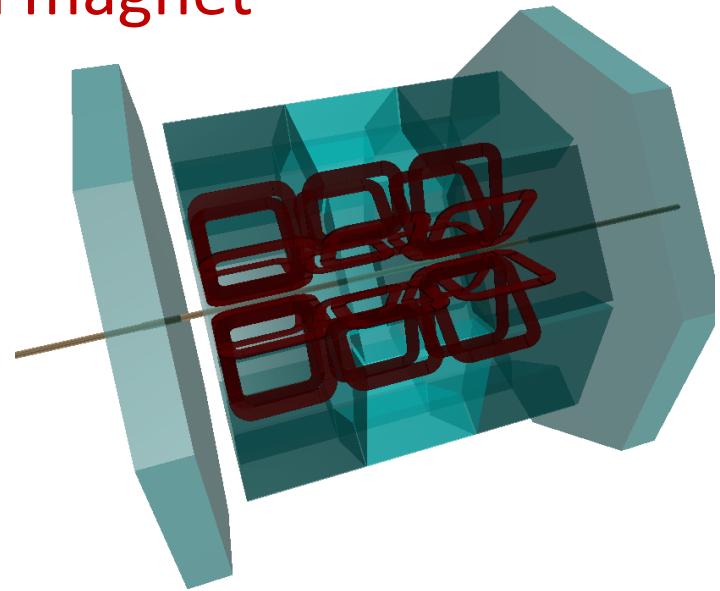
Hybrid magnet



Solenoid magnet

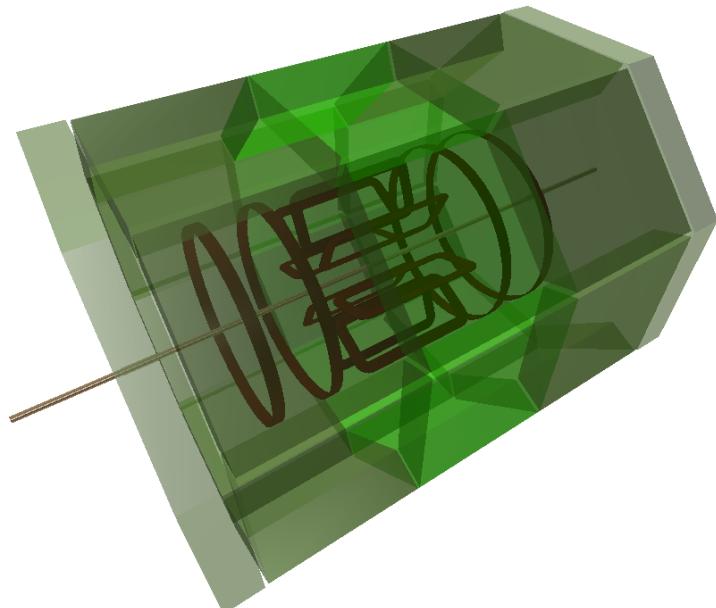


Toroid magnet

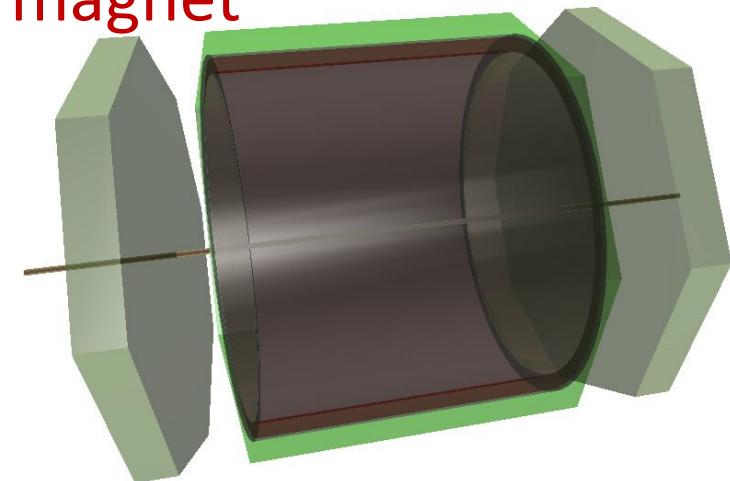


No structure

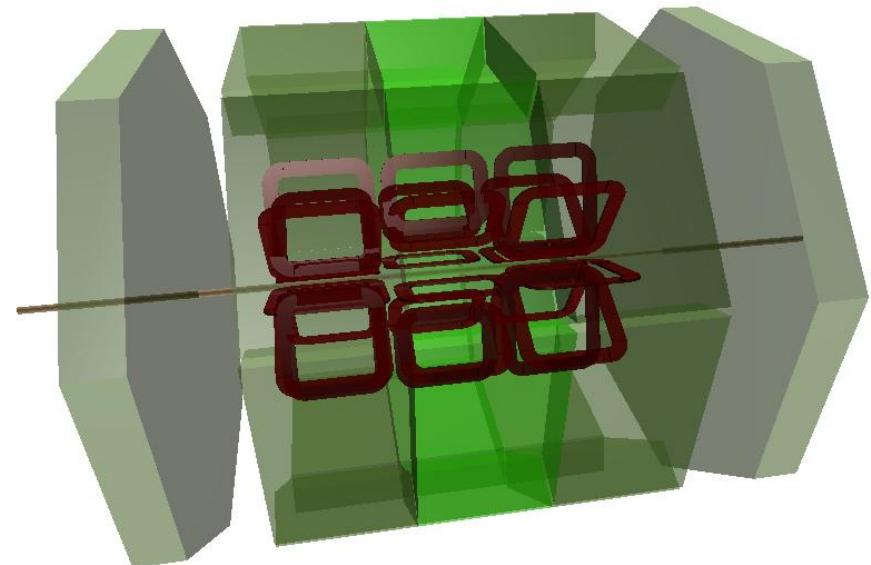
Hybrid magnet



Solenoid magnet



Toroid magnet

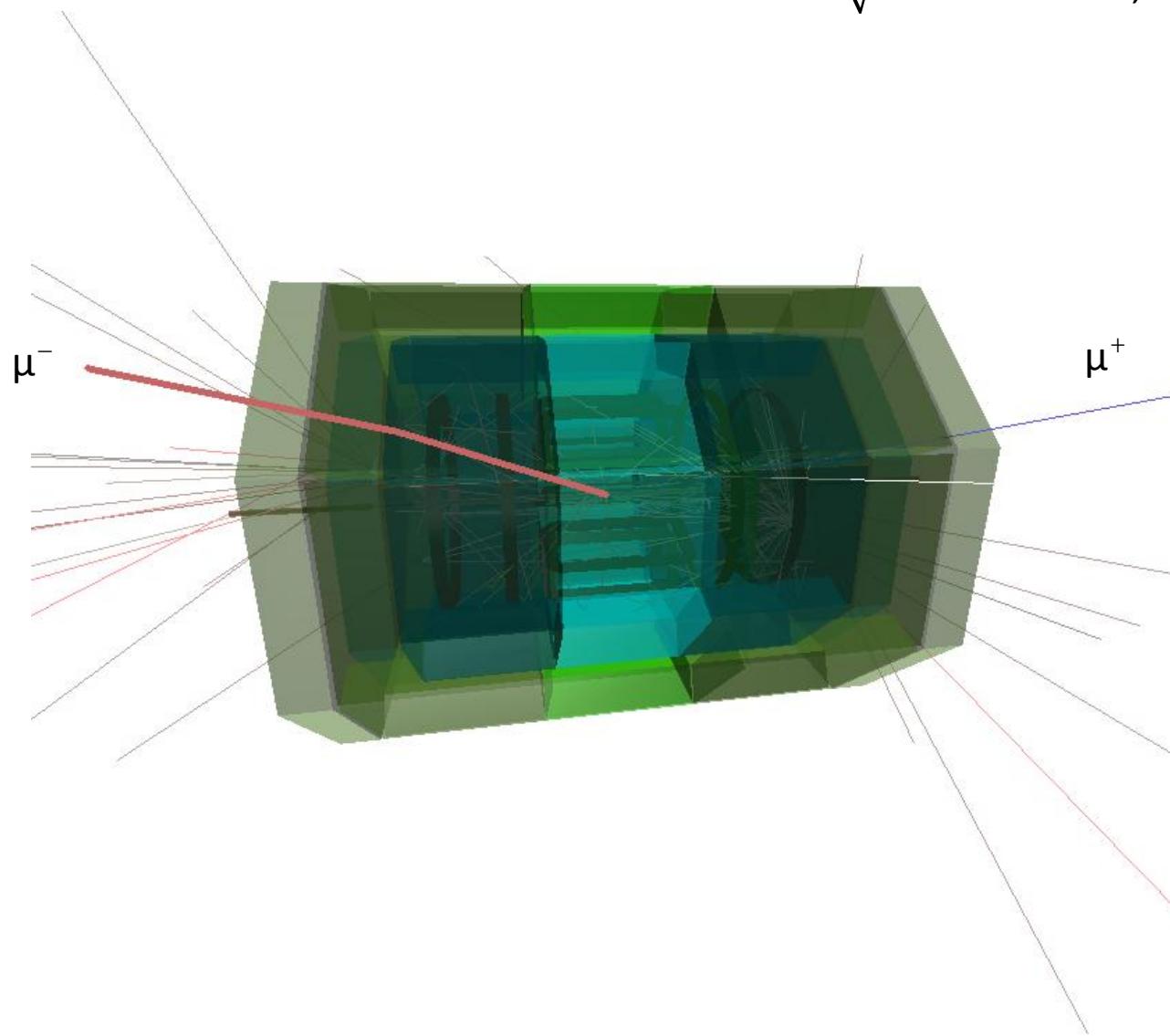


No structure

# *SpdRoot: Simulation*

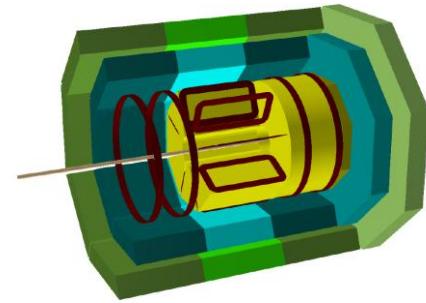
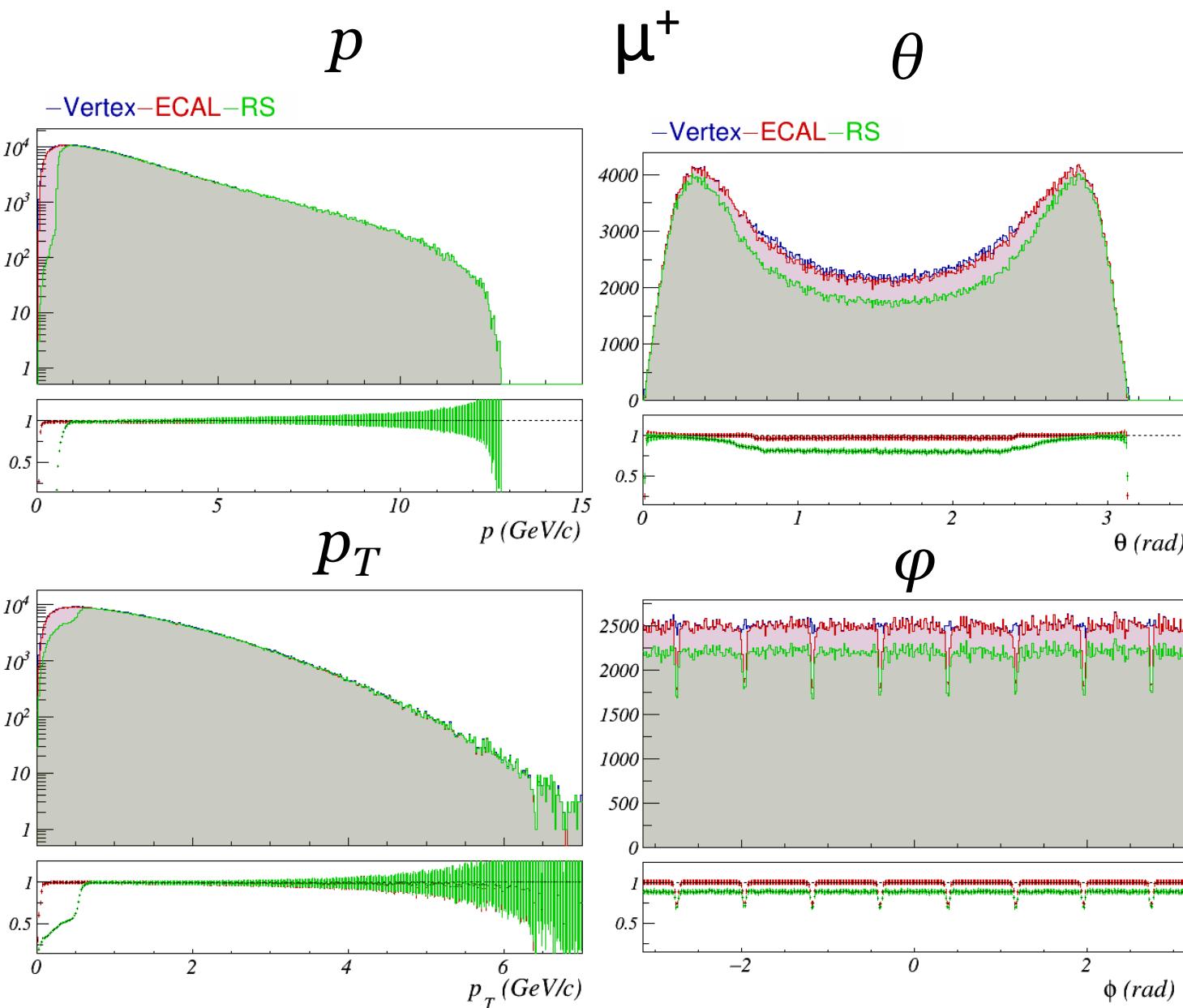
Example of DY event in *SpdRoot*

PYTHIA 6:  $\sqrt{s} = 25 \text{ GeV}$ , Drell-Yan



# Distributions of $\mu^+$ from initial vertex

PYTHIA 6:  $\sqrt{s} = 25 \text{ GeV}$ , Drell-Yan

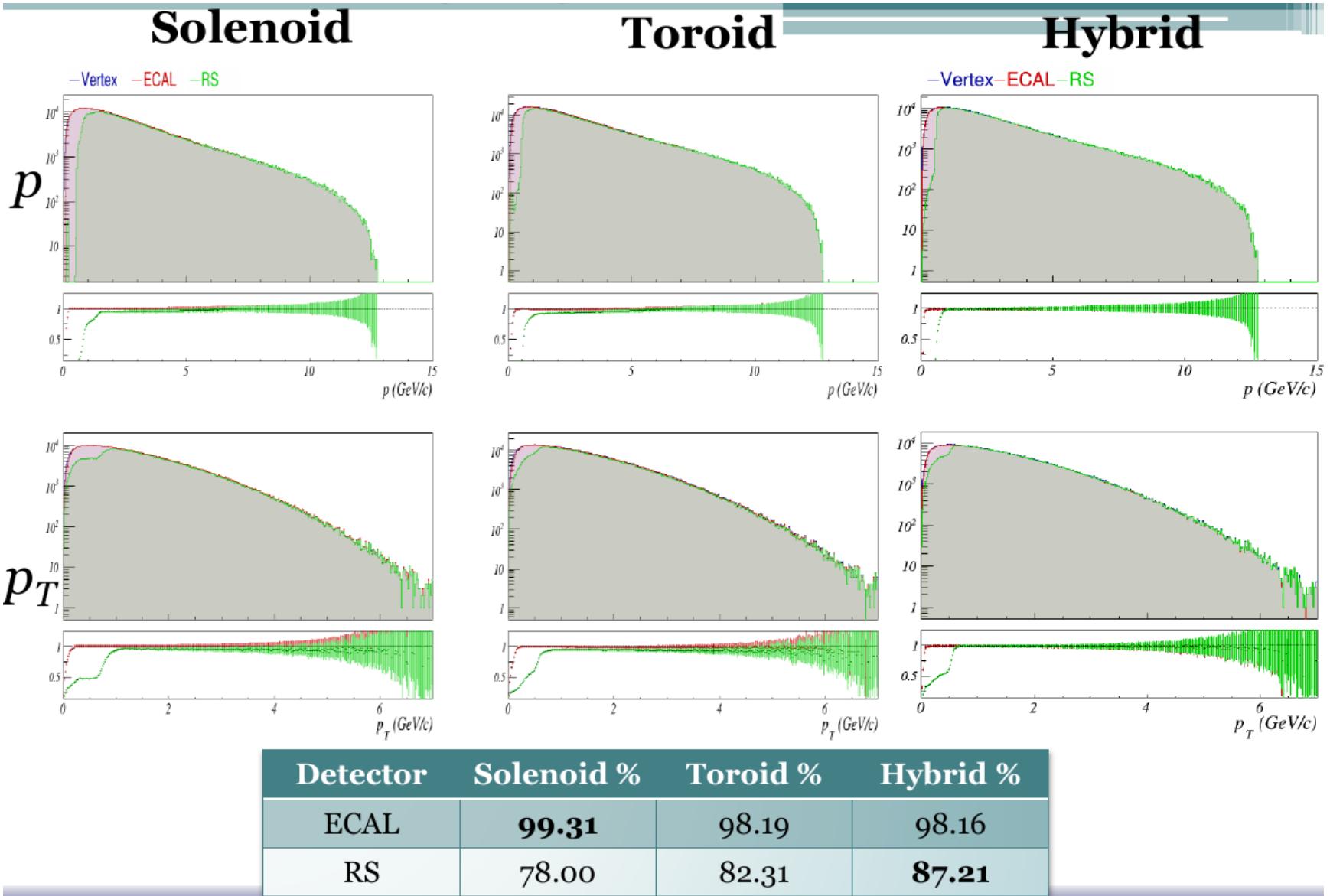


# Conclusion

- The simulation framework *SpdRoot* for the SPD experiment is under development
- The tests and analyses of future physics in the SPD experiment are already started in *SpdRoot*

# Backup

# Solenoid vs Toroid vs Hybrid: $\mu^+$



# Magnet

$$B^{(z)}(x, y, 0) = 0.$$

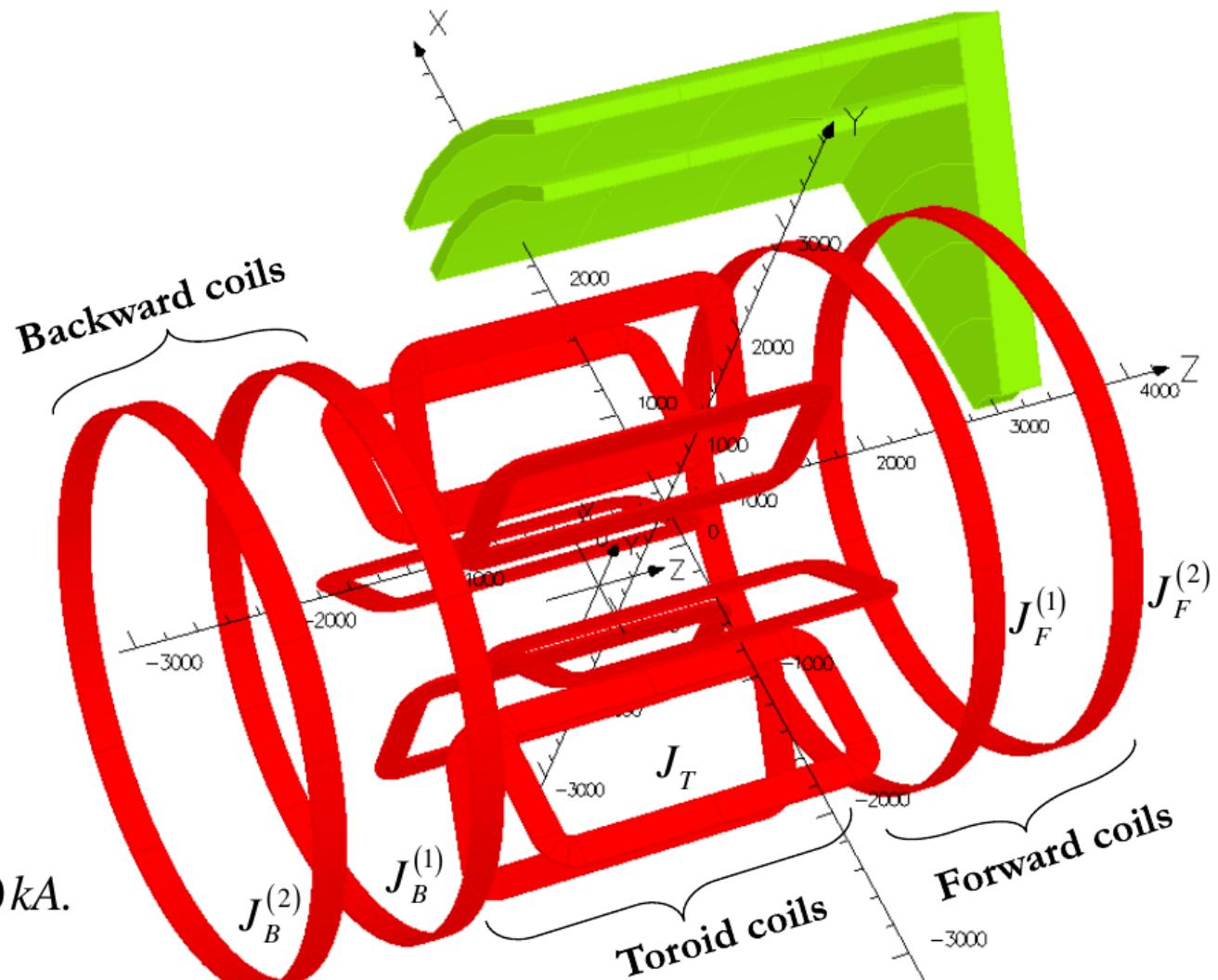
$$J_T = 40 \frac{A}{mm^2},$$

$$J_{B\setminus F}^{(1,2)} = m80 \frac{A}{mm^2},$$

$$S = 200 \times 20 mm^2,$$

$$I_T = J_T \cdot S = 160 kA,$$

$$I_{B\setminus F} = J_{B\setminus F} \cdot S = m320 kA.$$



# Magnet

