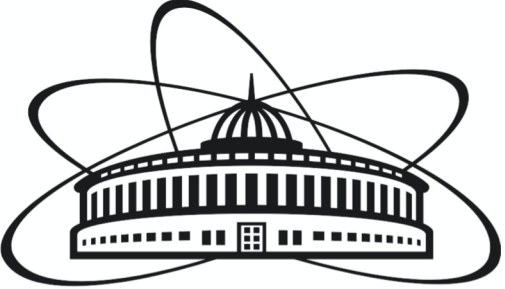


SPD Range System Modeling

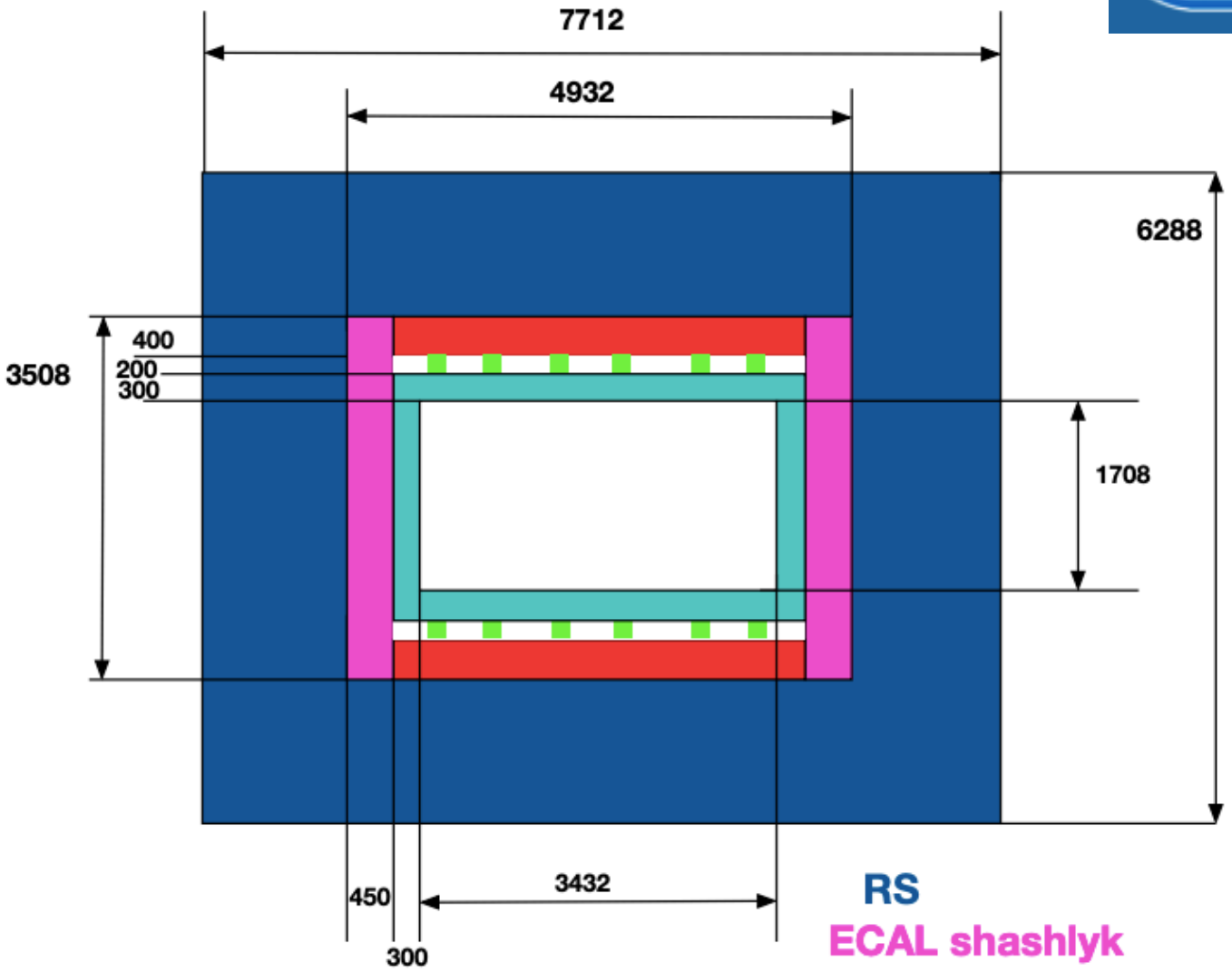
Alexander Verkheev (DLNP, JINR)
on behalf of the SPD Muon Group

SPD Physics & MC Meeting
22 July 2020

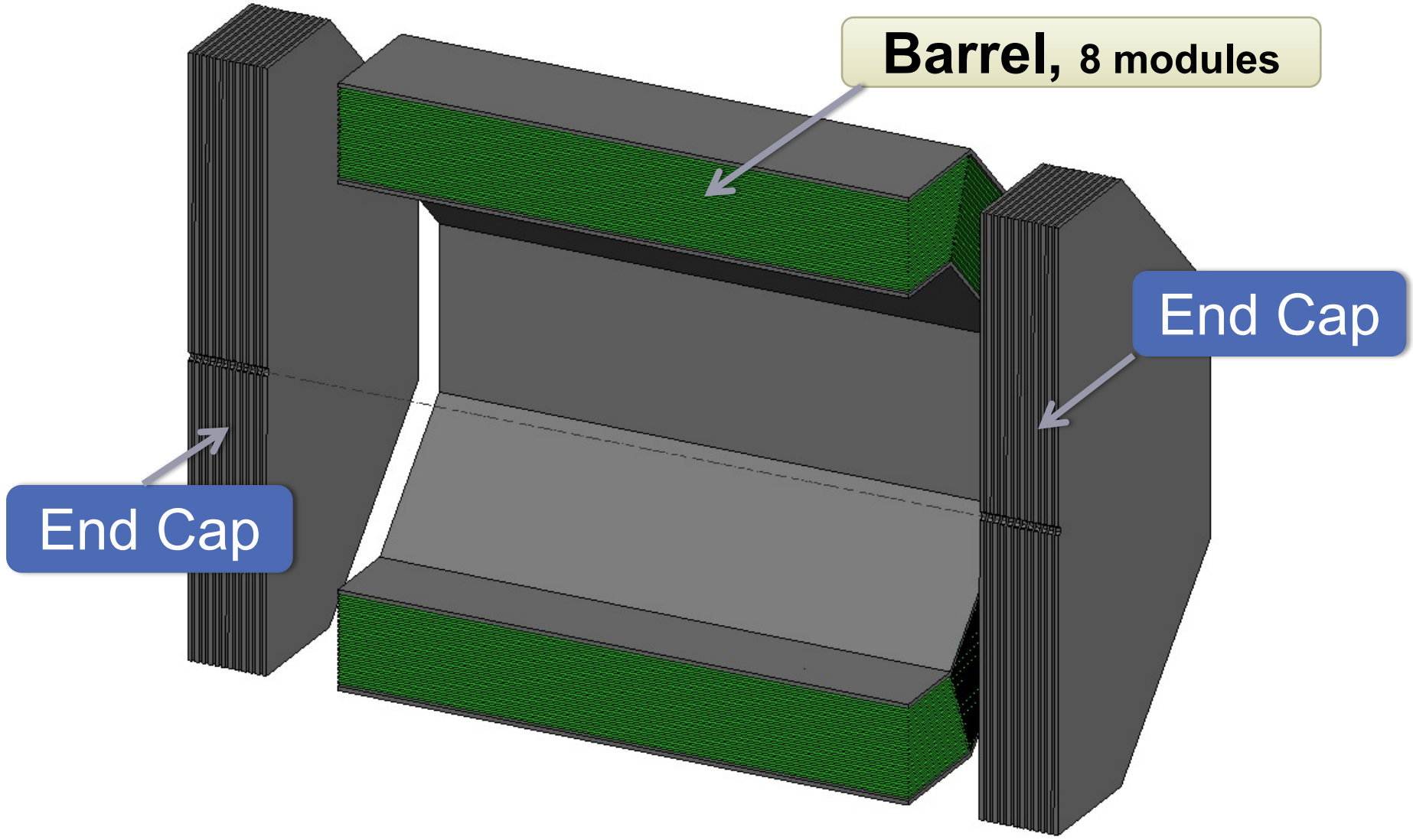
Muon System as PID

- SPD/NICA Muon System based on range system technique is a good PID system for muon identification and muon-to-hadron separation.
- It works in full energy range of secondary particles at SPD (0.5 ÷ 10 GeV).
- It resolves muons and hadrons with ~ 100% efficiency (”zero” hadron contamination) above ~ 1 GeV by obviously different response pattern.
- Important feature of range system is possibility to be used as coarse sampling (30 mm to 60 mm of Fe in our case) hadron calorimeter.

SPD Setup (sketch)



SPD Range System



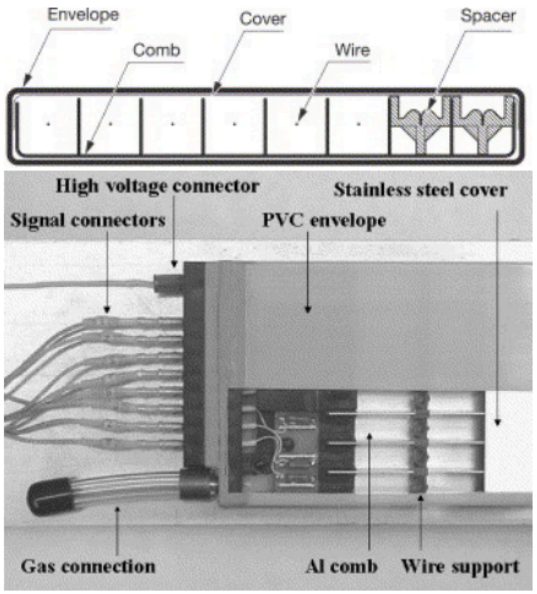
3D model, vertical cross section

SPD Barrel and EC Structure (Cross Section)

35 mm – gaps for MDT detectors

2 x 60 mm / Fe

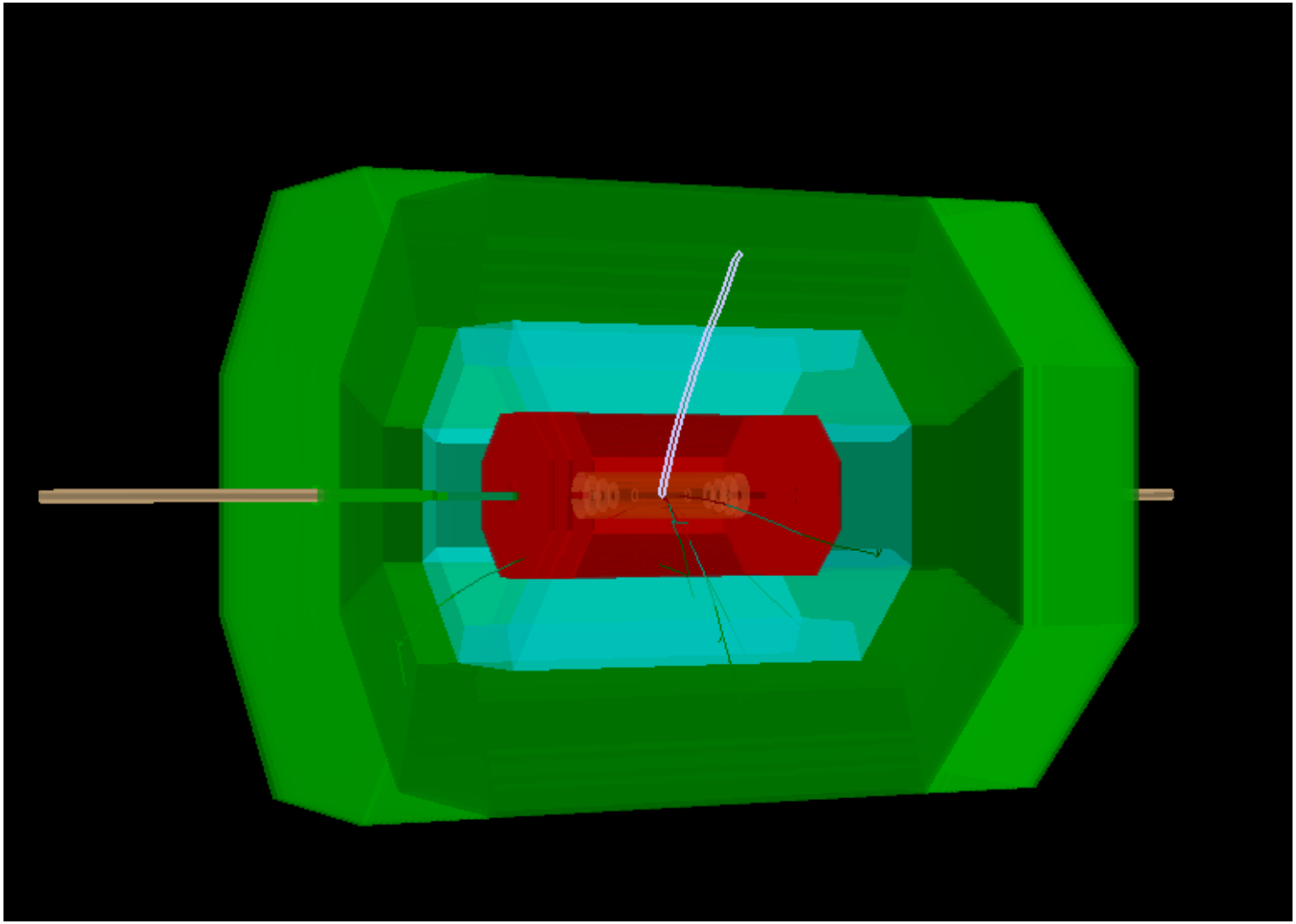
19 x 30 mm / Fe



MDT detector

Geometry @ SpdRoot

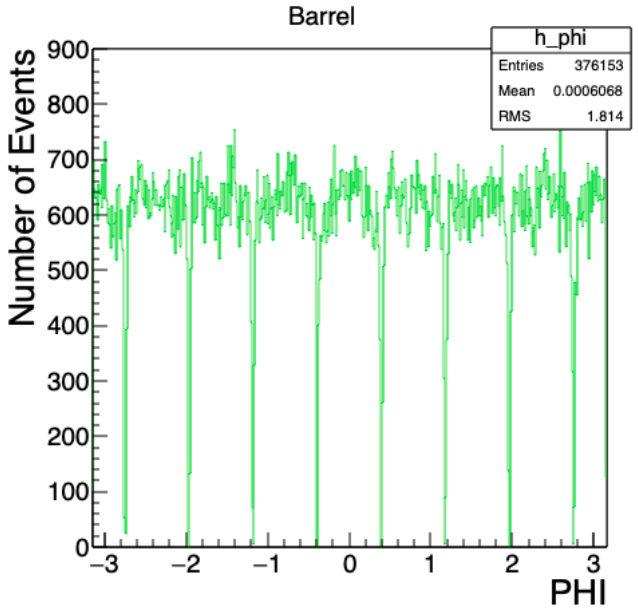
SpdIsotropicGenerator (10 mu, E = 1 GeV, ordinary)

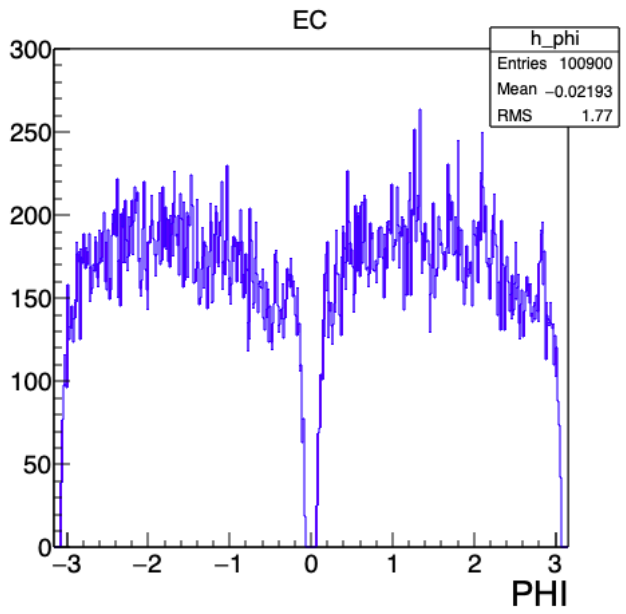


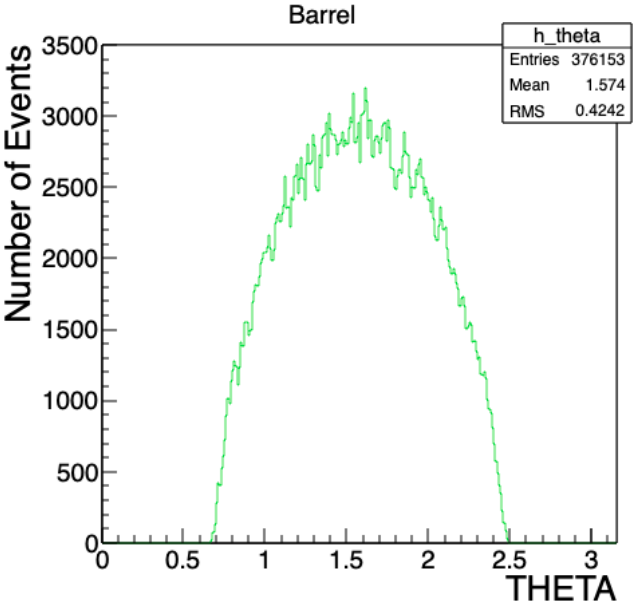
Distributions

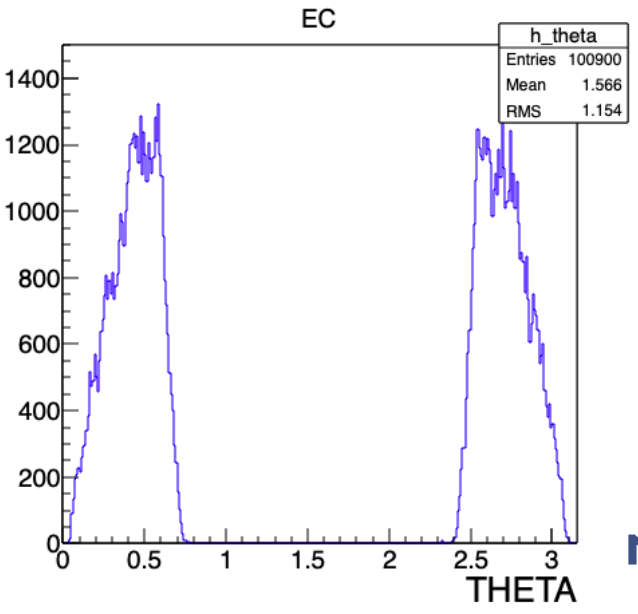
SpdIsotropicGenerator
40962 mu,
E = 1 GeV,
ang. reso ~1 deg

Classes:
SpdRsTB2Point
SpdRsTEC2Point

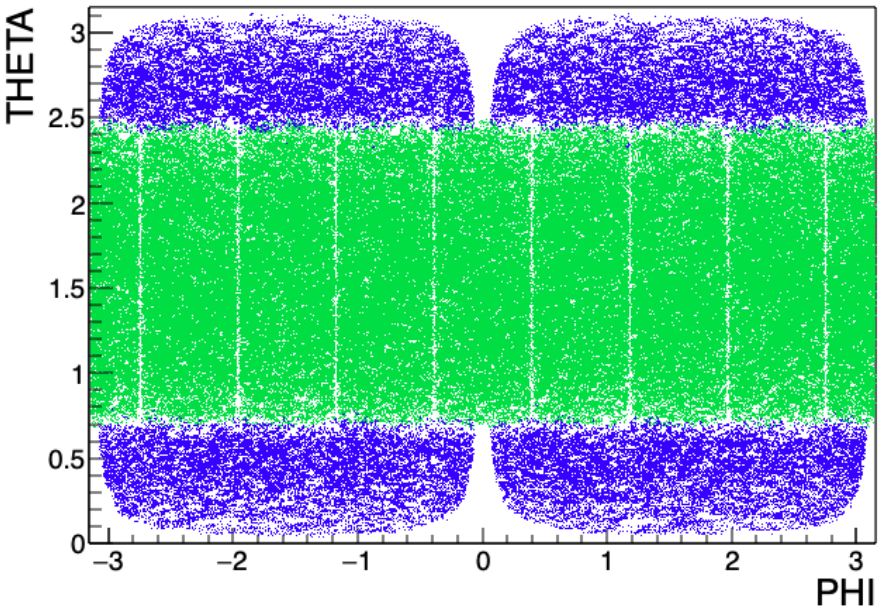


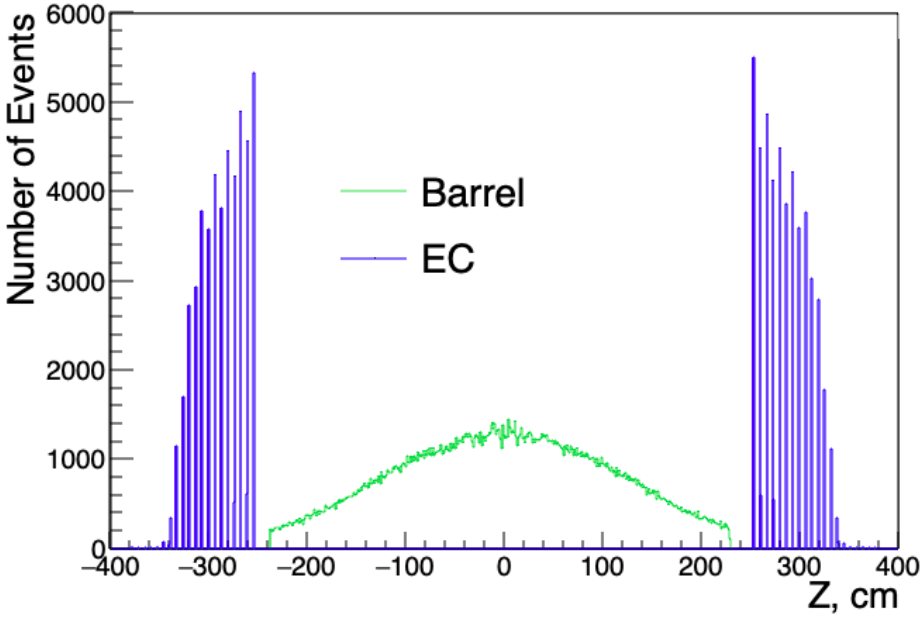






Distributions (cont'd)





Summary and Plans

Status:

- SPD Range System geometry is ready and integrated to SpdRoot (development branch).

Plans:

- Digitization / pattern recognition of hadrons and muons.