ST simulation status

(barrel part)

K.Kuznetsova, A.Lazarev, S.Romakhov

for the SPD Straw Simulation team

SPD SW&Computing meeting

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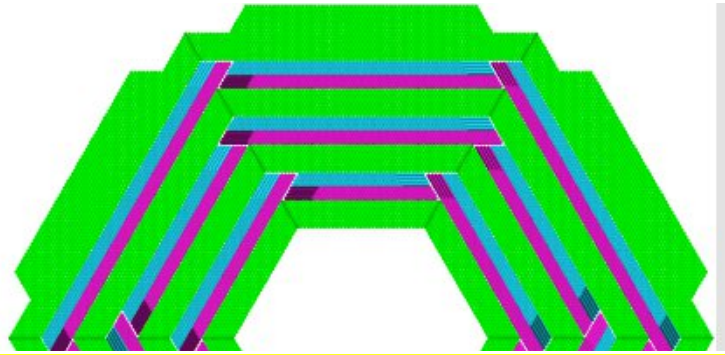
GeoModel - Sampo Baseline

S. Romakhov in contact with T.Enik and E.Tcherniaev

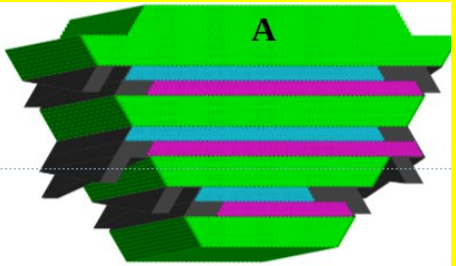
Barrel of Straw Tracker

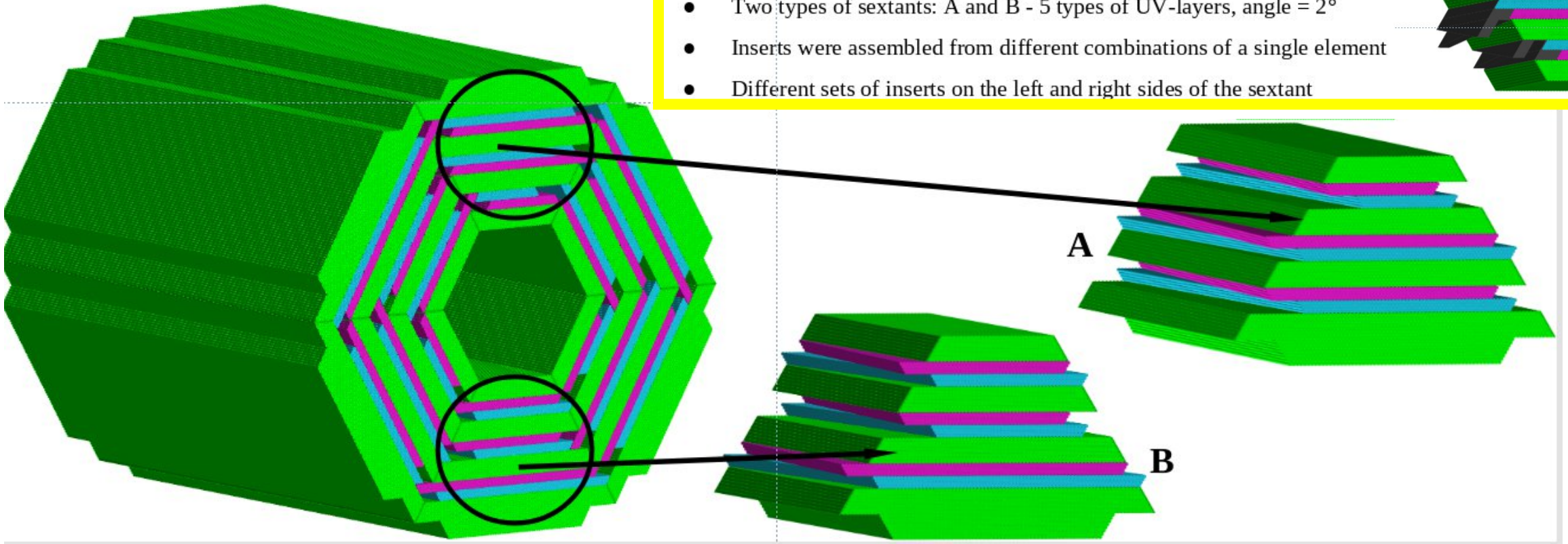
- ST barrel consists of **6 modules** (sextants)
- Sextants are of two types: **Type A (3648 tubes)** and **Type B (3784 tubes)**, which are arranged in layers with orientation **Z, +2° , -2°**
- Total number of tubes is 3648 x 3 (A) + 3784 x 3 (B) = **22 296 tubes**
- One straw is made of PET foil ultrasonic welded longitudinally thus forming a tube with **Ø = 10 mm**



Engineering problem:

- Two types of sextants: A and B - 5 types of UV-layers, angle = 2°
- Inserts were assembled from different combinations of a single element
- Different sets of inserts on the left and right sides of the sextant

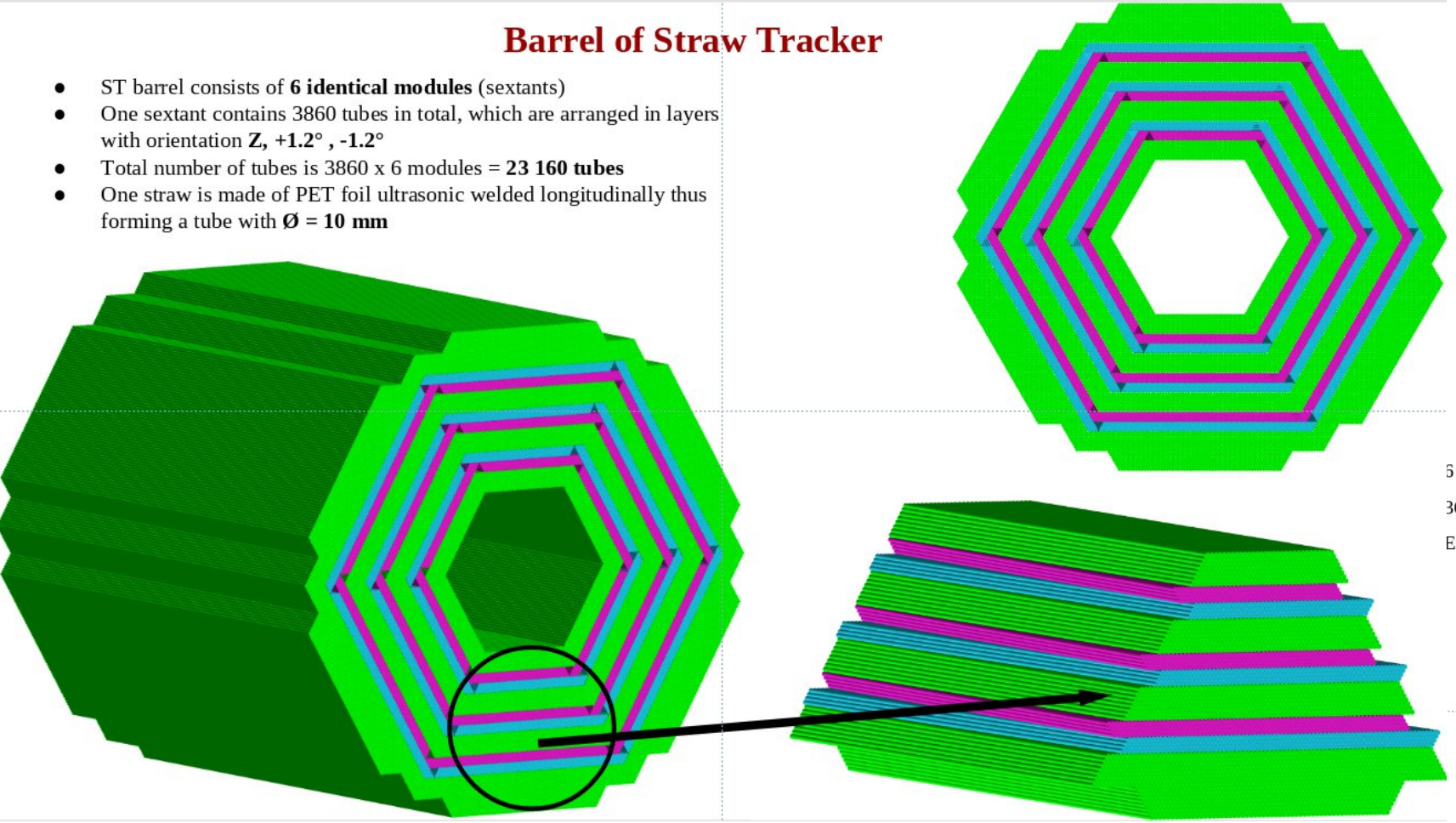




GeoModel - optimized version - to be introduced as optional geometry

Barrel of Straw Tracker

- ST barrel consists of **6 identical modules** (sextants)
- One sextant contains 3860 tubes in total, which are arranged in layers with orientation **Z, +1.2° , -1.2°**
- Total number of tubes is 3860 x 6 modules = **23 160 tubes**
- One straw is made of PET foil ultrasonic welded longitudinally thus forming a tube with **Ø = 10 mm**

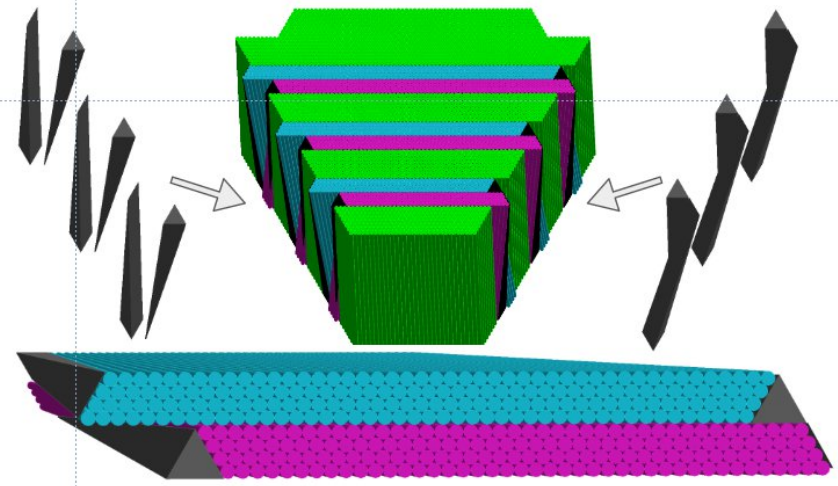


Inserts

6 identical sextants: 3 types of UV-layers, angle = 1.2°

36 identical inserts on each side, symmetrically placed

Empty space partially replaced by tubes - 864 additional UV tubes in the full barrel



Hit Digi + Hit Reco

- finishing validation in SPDroot for Digitization and Hit coordinate Reco algorithms - to be completed in January -> March... (Physics&MC meeting tomorrow)

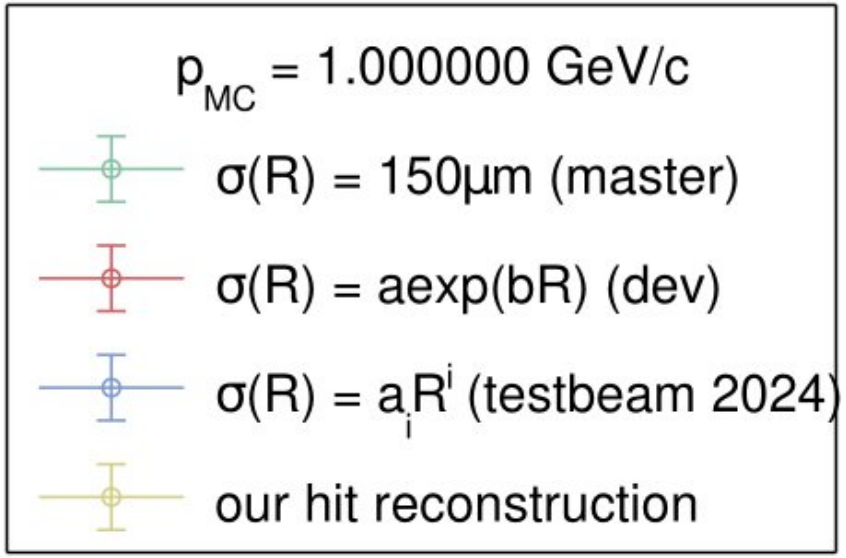
- Digitization of ionization energy losses (electronics saturation) - ongoing, will be ready for implementation in Sampo in ~ April-May

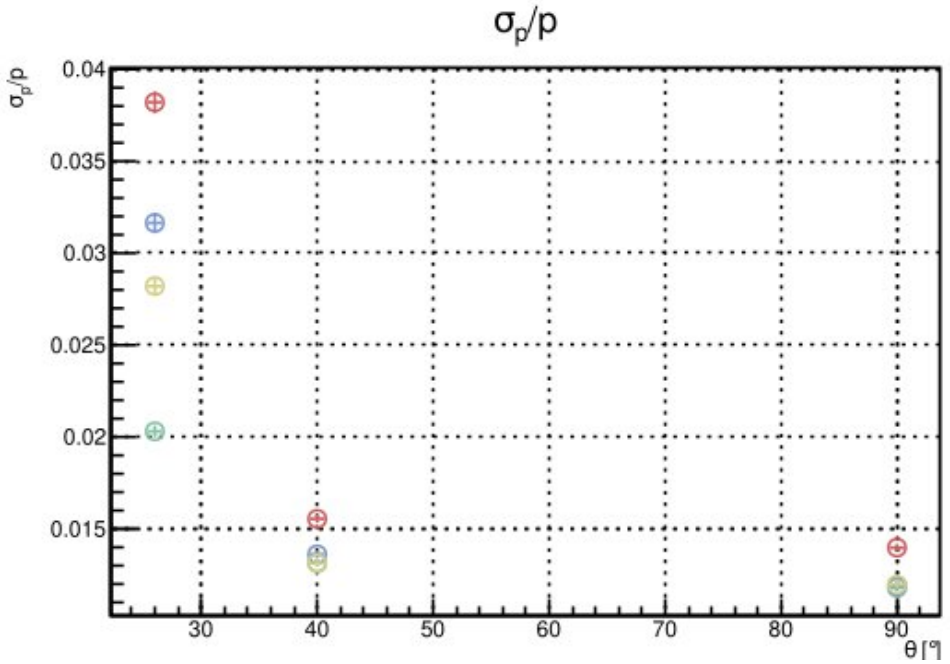
Includes

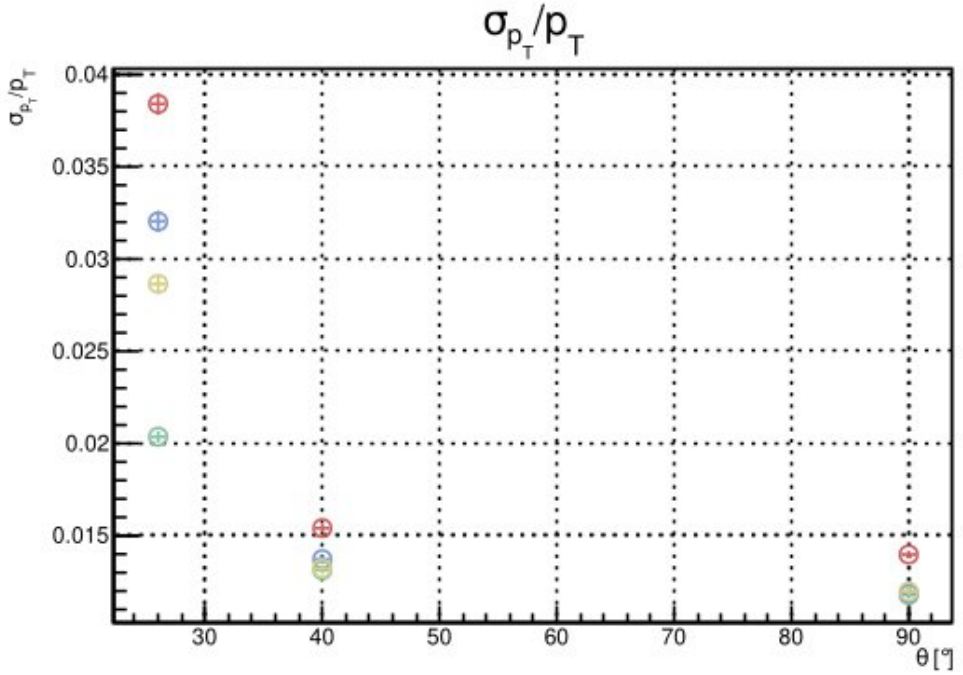
- parametrization for Digitization for a given readout model(s)
  - R_MC -> t_hit(R_MC, Theta_MC)
  - E_MC -> signal_ampl(E_MC, Theta_MC, P_MC, particle type, K) where K=mV/keV
- hit reconstruction
  - R_reco(t_hit, theta_track=Theta_MC)
  - E_reco(K)

Hit coordinates

A. Lazarev in contact with E. Masalova





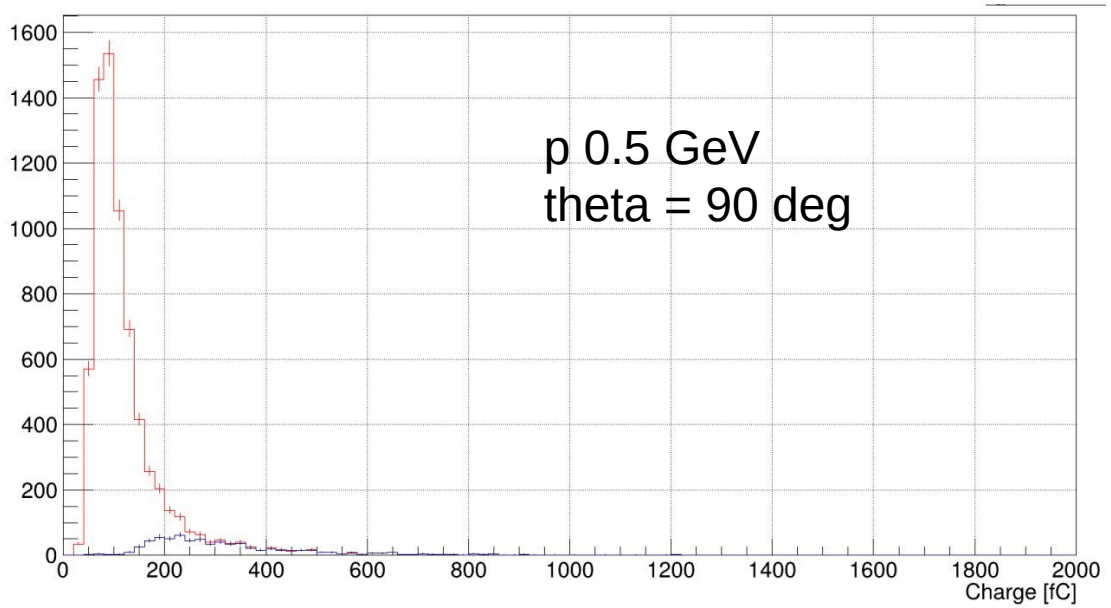


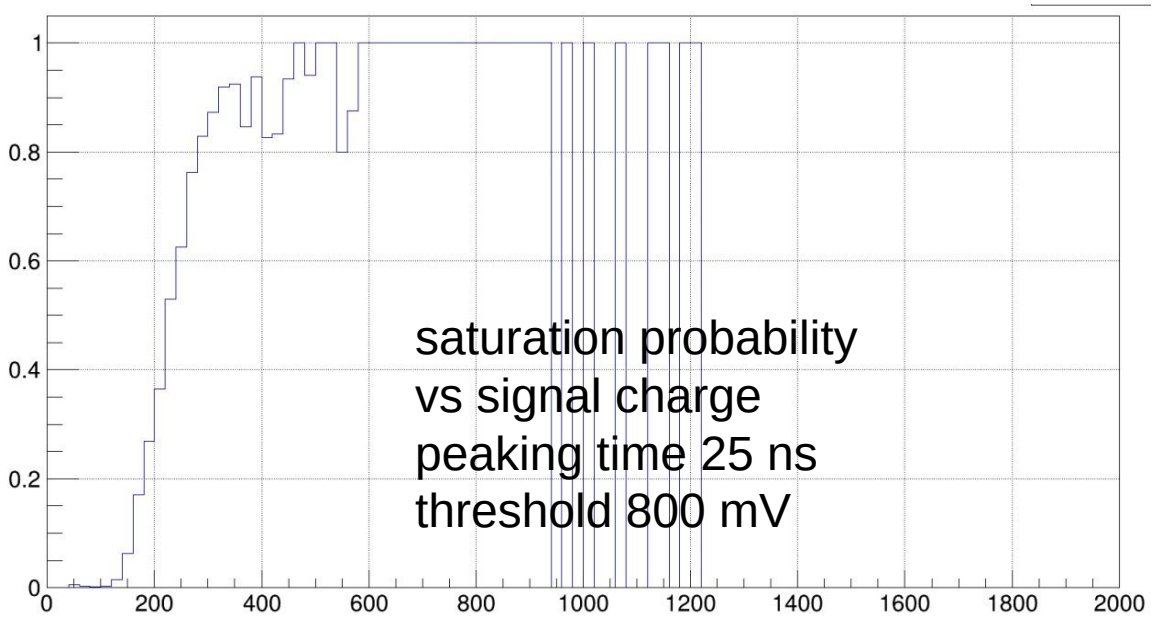
- validation in SPDroot
  - default approaches wrt previous studies
  - comparison of performance realistic approach vs previous versions without reconstruction
  - talk by Alexandr tomorrow
  - next steps - transfer to Sampo

Signal charge

A. Nartov, A.Gurova, S.Bulanova

- Garfield/LTSpice
  - charge distribution wrt different PA peaking time
  - saturation case (low momenta particles)





WORK IN PROGRES