

PAPAS FOR SCTAU

G. P. Razuvaev

29th June, 2018

Data formation

Generator data

Papas

Tracker, calorimeter,
solenoid

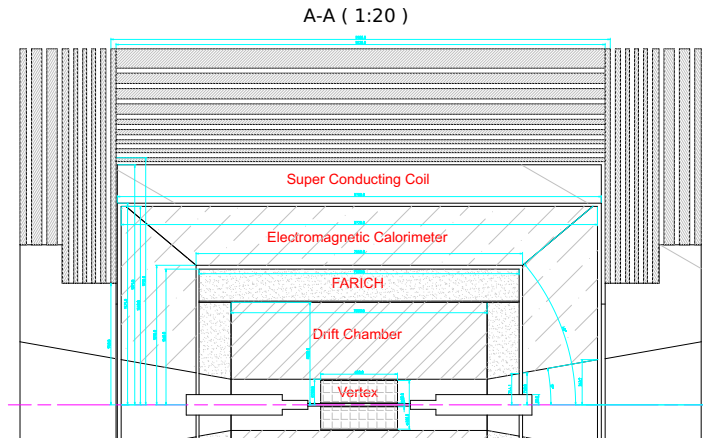
Detector response

Reconstructed
particles

PID systems

Background and fake
particles

User tree maker



Detector subsystems

Tracker

Papas has only one build-in tracker. The complex response represented DC + IT should be implemented:

```
if pt < 0.1:
    return False
elif pt < 0.3:
    return rnd < 0.9
elif pt < 1.:
    return rnd < 0.95
else:
    return rnd < 0.99
```

The BaBar DC resolution model has been used.

$$\frac{\sigma}{p_T} = 0.13\% \times p_T + 0.45\%$$

Detector subsystems

Calorimeter

A hadron calorimeter is suppressed.

The electromagnetic calorimeter parameters are taken from D. A. Epifanov's CHARM-18 satellite presentation (pure CsI).

$$\frac{\sigma_E}{E} = \frac{0.82\%}{\sqrt[4]{E}} \oplus \frac{0.066\%}{E} \oplus 1.34\%$$

Different calorimeter options are possible, but parametrization is required.

Detector subsystems

PID

PID systems aren't presented in papas. Add their response externally knowing generated particle parameters.

Time of flight

FARICH

K_L - μ system

dE/dx

???

Parameterised response is needed.

The ToF system is under development:
just pure geometry calculation;
maybe switch to step by step simulation.

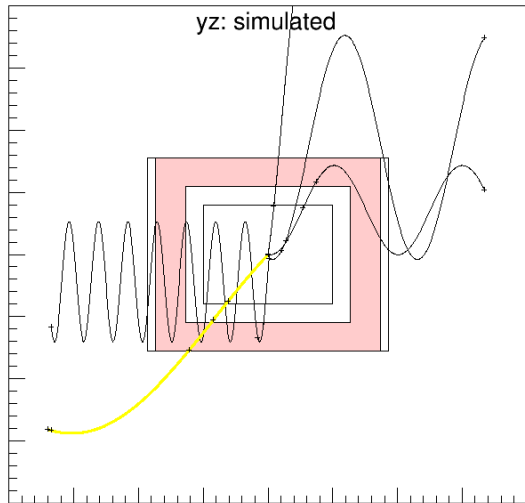
Output data

Now the output tree contains:

- Generator particles

- Generator vertices

- Reconstructed particles



Output tree

Branch	Description
n pdg, q, en, pt, px, py, pz, th, phi	# of rec. particles rec. parameters
n0 pdg0, q0, en0, px0, py0, pz0	# of gen. particles gen. parameters
nv0 vx0, vy0, vz0	# of gen. vertices gen. vert. parameters
recgen genver	rec.-gen. ptcl. connection gen. ptcl.-ver. connection

recgen is done by hand: for j -th rec. ptcl.
find the gen. ptcl. by

$$\min \left\{ \sum_{i=x,y,z} (p_i^j - p_{i0}^k)^2 \right\}$$

To get the i -th particle generated
parameters: **px0[recgen[i]]**.

To get the i -th particle vertex x
coordinate: **vx0[genver[recgen[i]]]**.

Results

Papas + Heppy employed.
More or less realistic geometry build.
An output tree is ready to be used.

Plans

Implement a PID system (ToF as the first try).
Develop the inner tracker effects.
Run generated data through Papas.
Wiki activity.



Fin