Status of t0 reconstruction

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Method

- Minimum bias pp 27 GeV events were generated
- TOF resolution = 70 ps
- 2% momentum smearing

The following χ^2 function has to be minimized

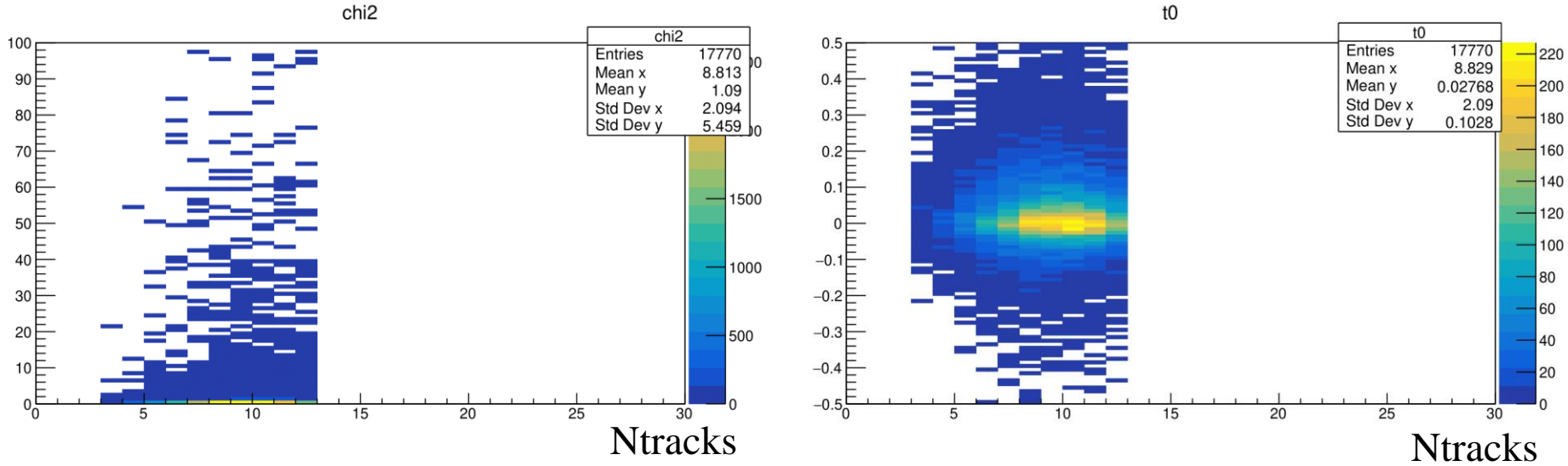$$\chi^2(\vec{m}_i) = \sum_N W_i((t_{TOF} - t_0(\vec{m}_i)) - t_{exp.\ i})^2.$$

Here

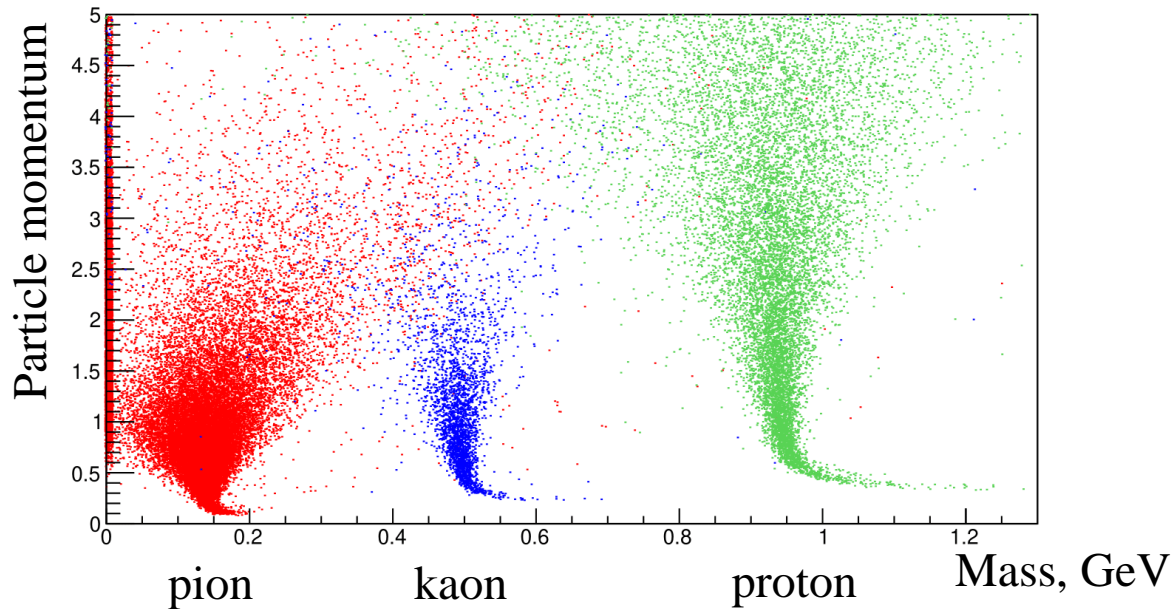$$t_0(\vec{m}_i) = \frac{\sum_N(t_{TOF} - t_{exp.\ i})}{\sum_N W_i}.$$

3 mass hypothesis were used: proton, kaon, negative pion.
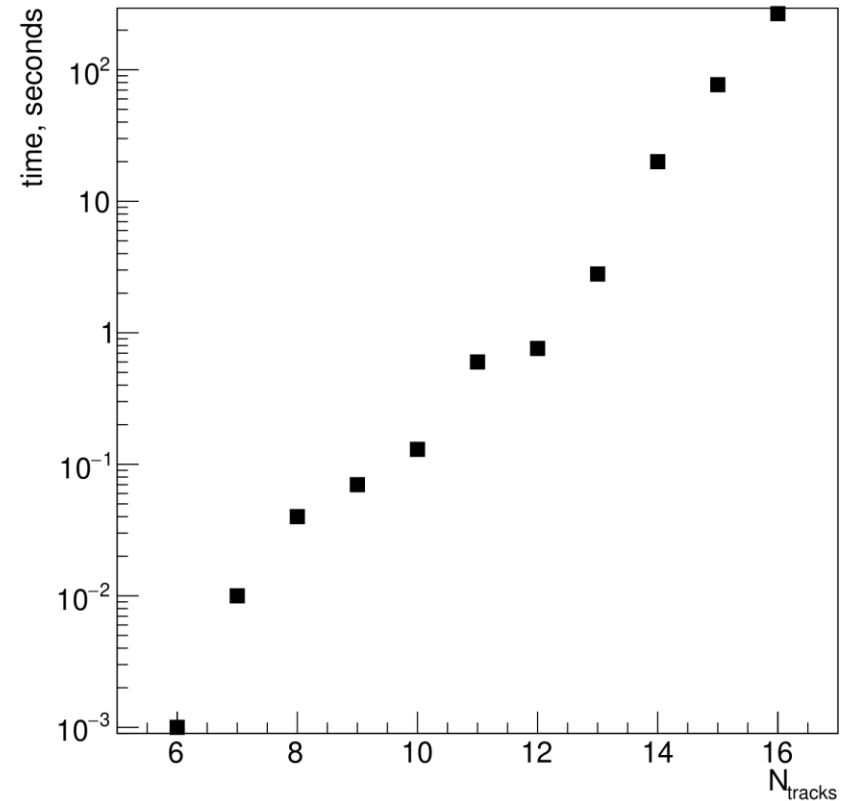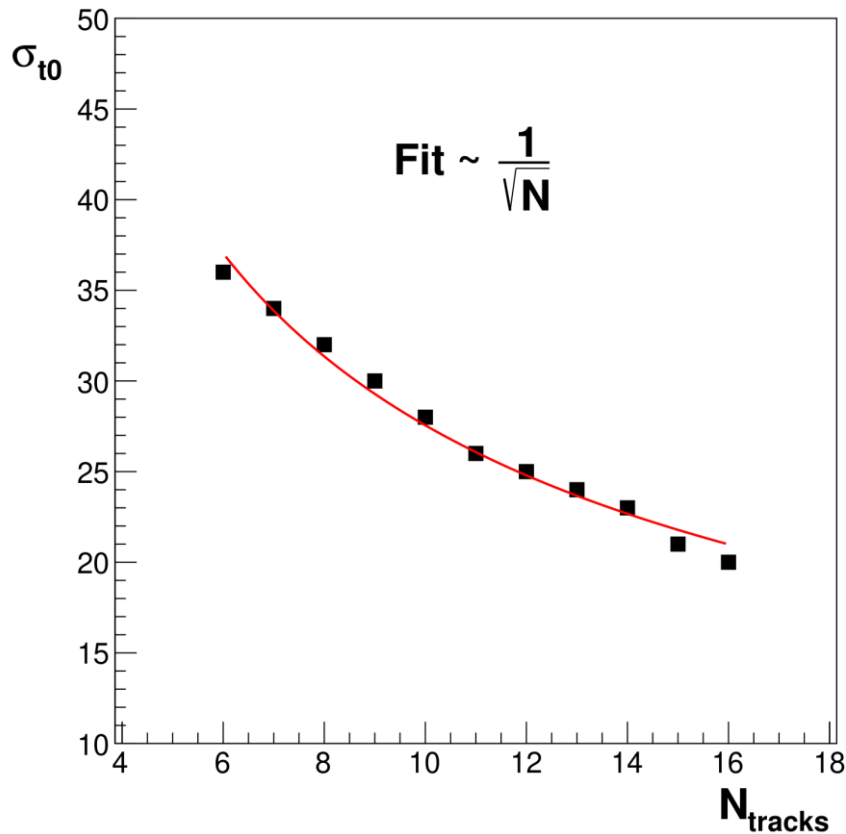
So we have $3^{Ntracks}$ combinations

Results

For mass reconstruction track from chi2 minimization procedure was excluded.

pion   kaon   proton   Mass, GeV

t0 reconstruction

More than 2 minutes needed to reconstruct t0 with 16 tracks in the event

t0 reconstruction

We take event with 16 tracks and then one by one remove tracks with the smallest momentum

Number of tracks	Running time, s	Accuracy of t0 reconstruction, ps
14	25	21
13	9	23
12	2	23
11	0.7	25
10	0.22	28
9	0.07	30
8	0.04	31
7	0.04	35
6	0.04	70

Next step – try to use genetic algorithm instead chi2 minimization