

Pion-muon separation in December 2011 run /update/

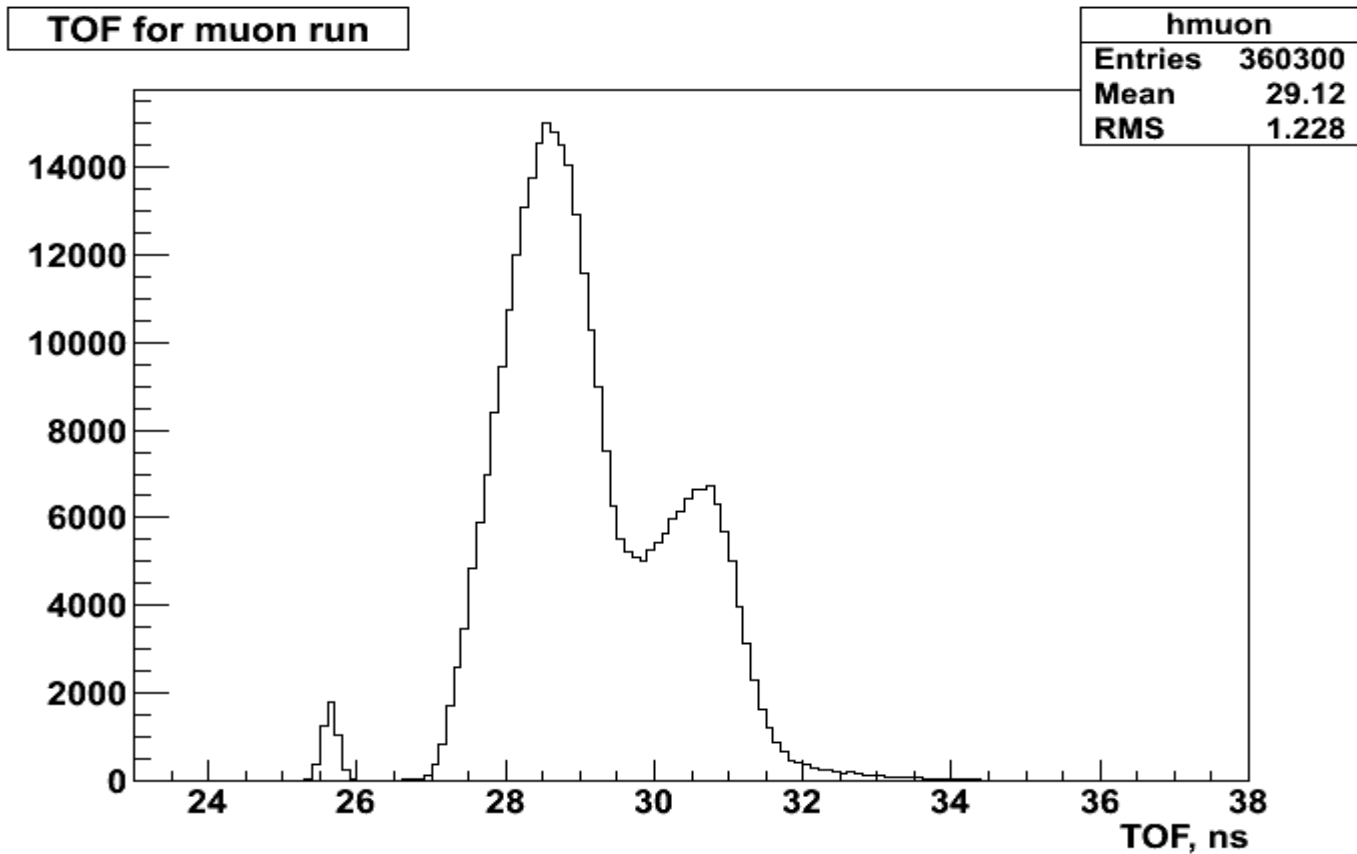
M.Bogomilov, Y.Karadzhov

Runs

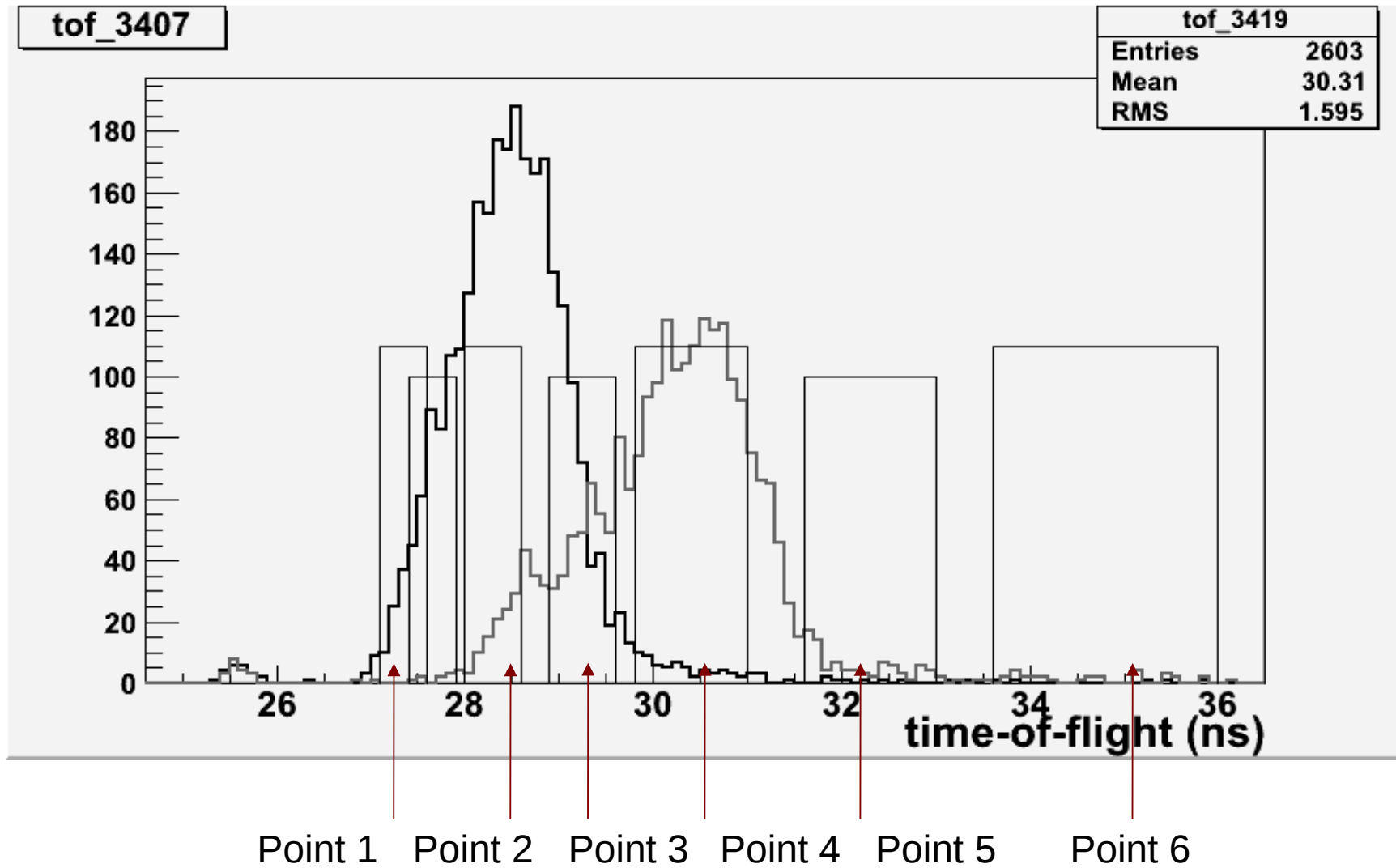
Muon runs:

nominal => 3407, 3506, 3507, 3514, 3515, 3516 (entire runs)

140 MeV/c, 6pi => 3419, 3420, 3495 (entire runs)

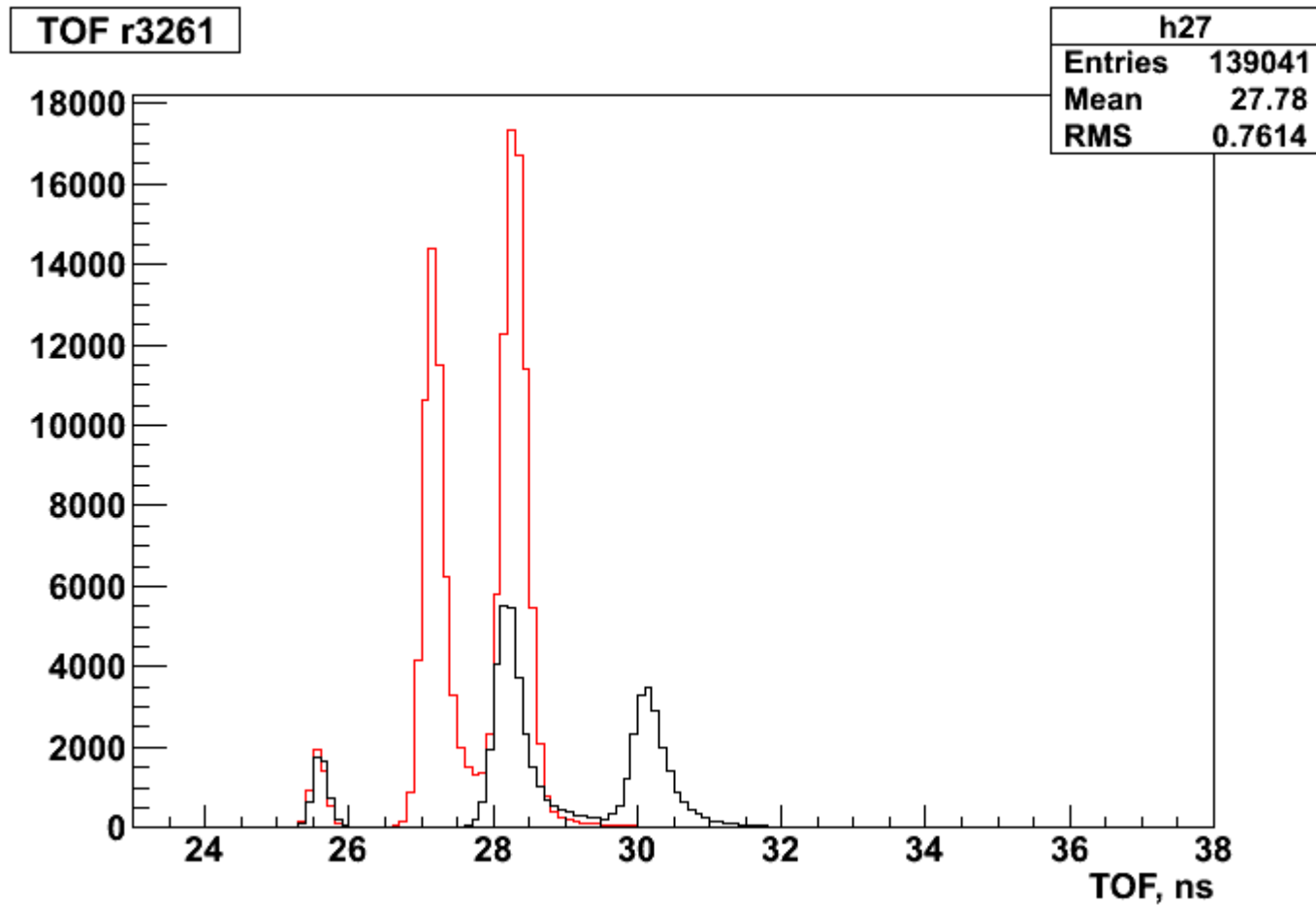


Covered points



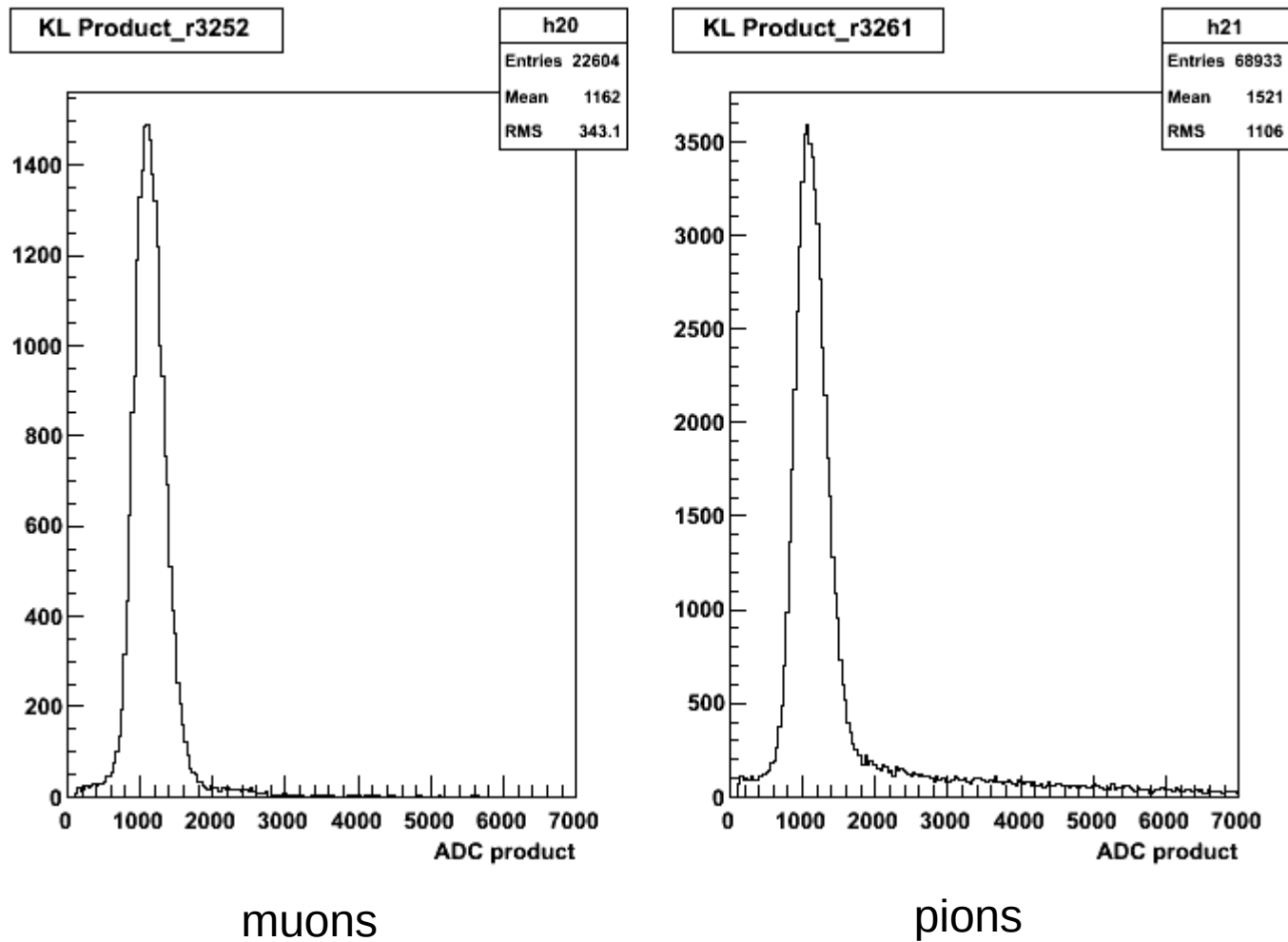
Point 2

28.0 < tof < 28.6 ns



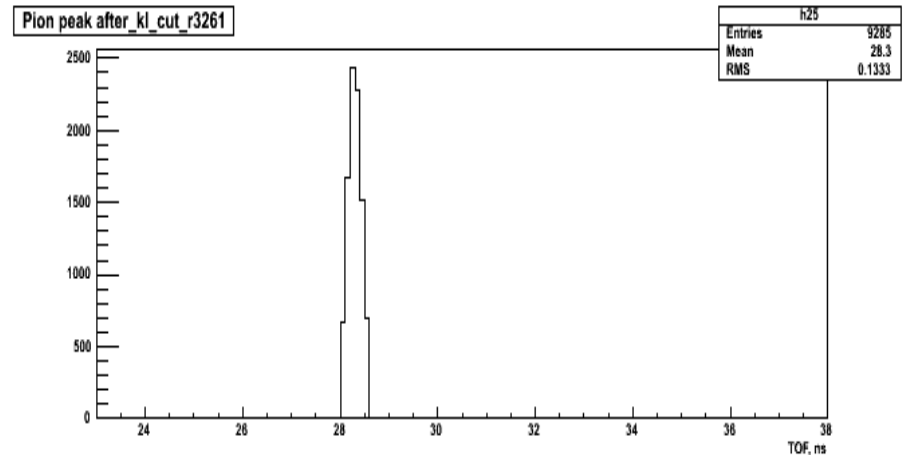
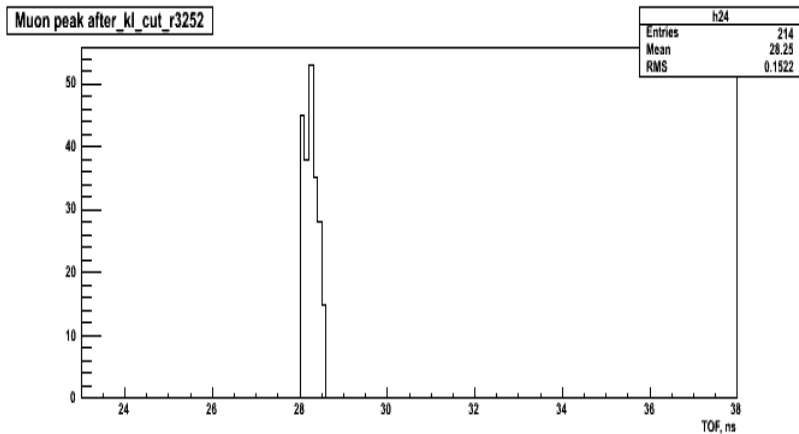
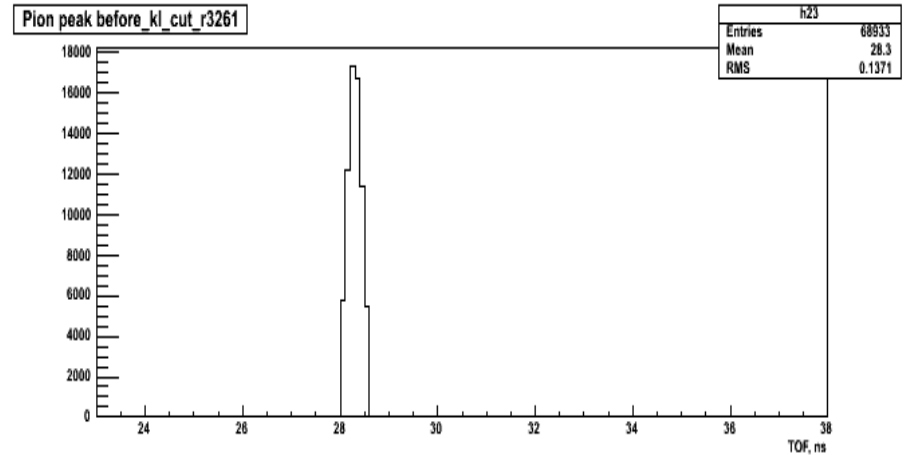
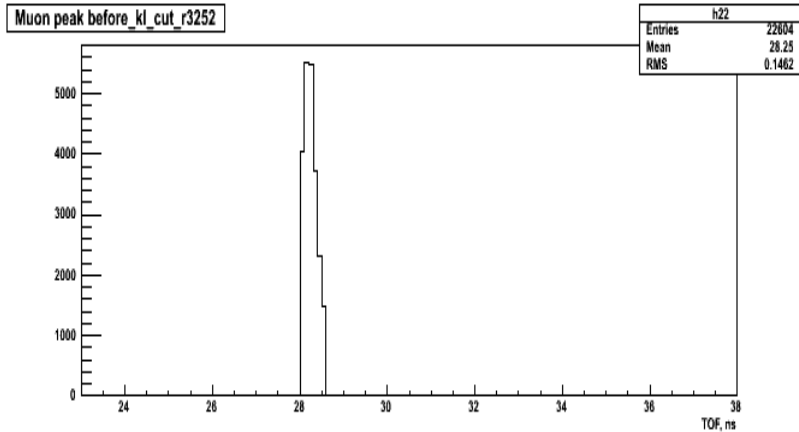
TOF cut on KL for Point 2

TofCut = $28.0 < \text{tof} < 28.6$ ns



Muons and pions before and after the cut

CUT="28.0 <TOF<28.6 && kl_product>2500"

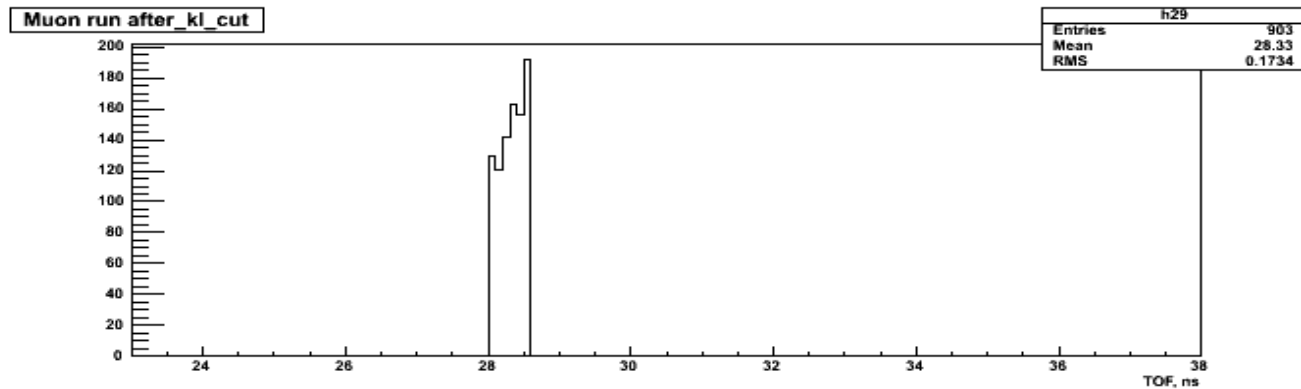
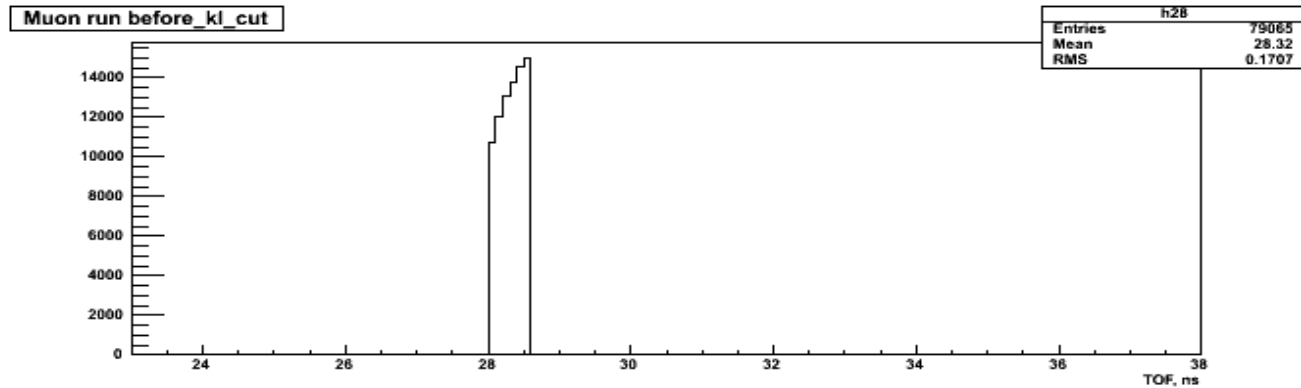


Remaining muons 0.9%

Remaining pions 13.5%

Same cut to muon run

CUT="28.0 <TOF<28.6 && kl_product>2500"

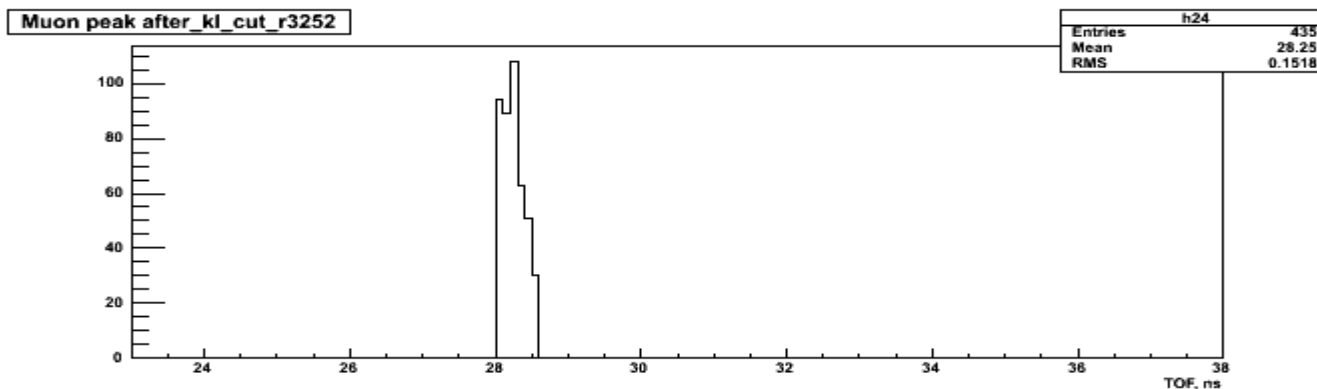
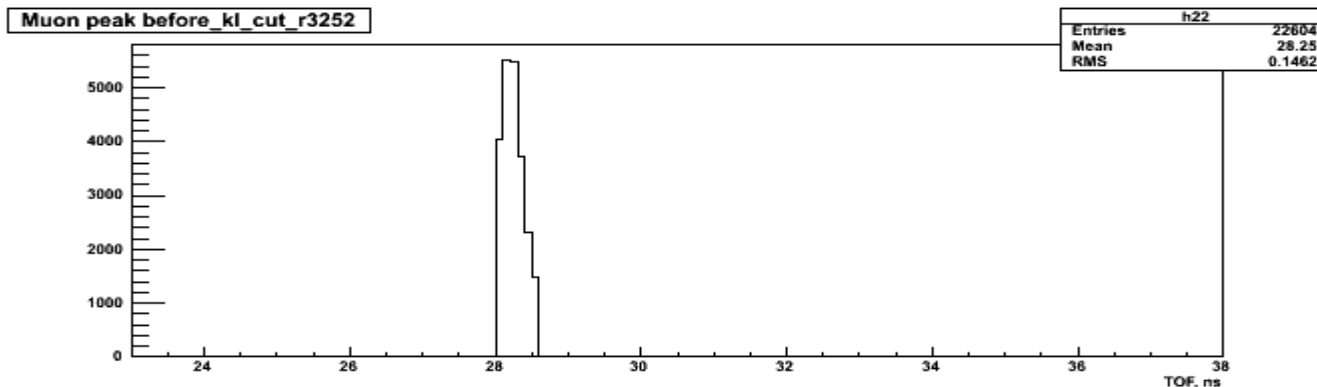


The system is:
 $79065 = N_{\mu} + N_{\pi}$
 $903 = 0.009N_{\mu} + 0.135N_{\pi}$

The solution is:
 $N_{\mu} = 77355 \Rightarrow 97.8\%$
 $N_{\pi} = 1710 \Rightarrow 2.2\%$

But if I change the cut

CUT="28.0 <TOF<28.6 && kl_product>2000"

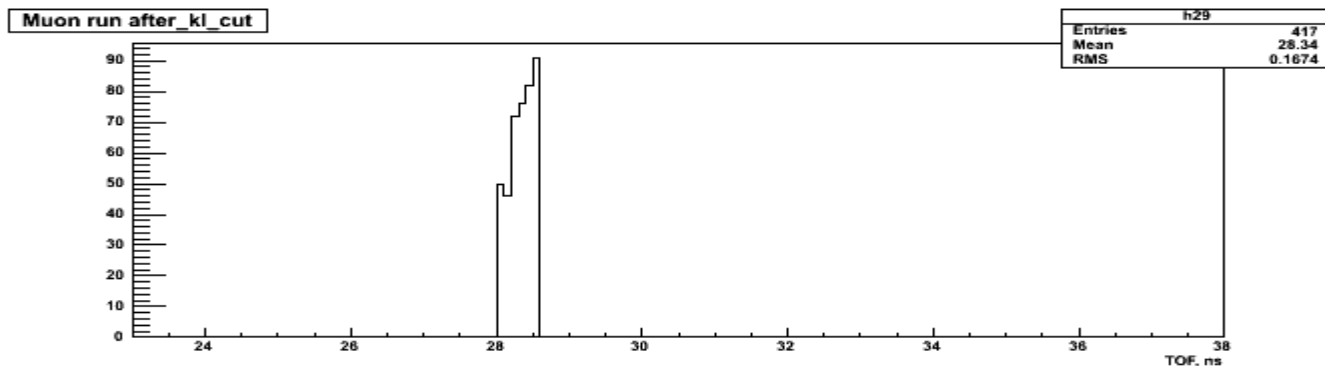
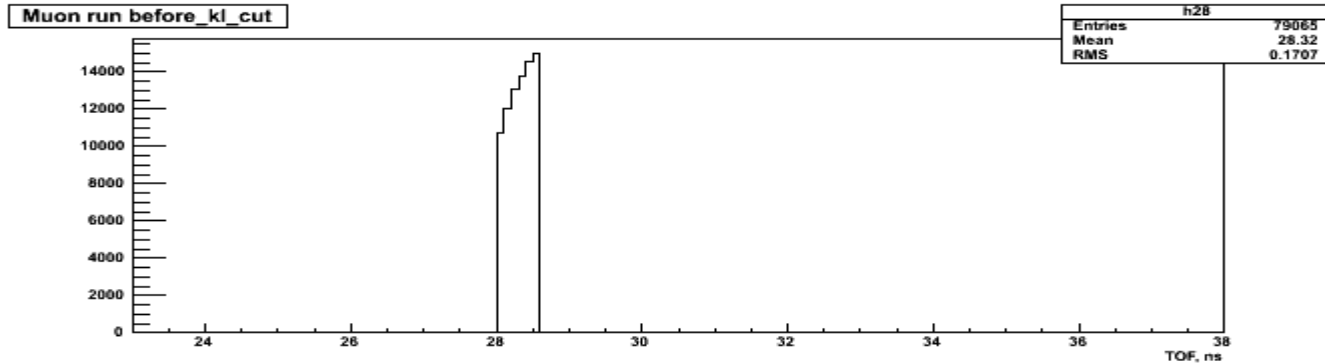


The system is:
 $79065 = N_{\mu} + N_{\pi}$
 $2154 = 0.019N_{\mu} + 0.16N_{\pi}$

The solution is:
 $N_{\mu} = 76879 \Rightarrow 97.2\%$
 $N_{\pi} = 2186 \Rightarrow 2.7\%$

But if I change the cut again

CUT="28.0 <TOF<28.6 && kl_product>3000"



The system is:
 $79065 = N_{\mu} + N_{\pi}$
 $417 = 0.005N_{\mu} + 0.113N_{\pi}$

The solution is:
 $N_{\mu} = 78864 \Rightarrow 99.7\%$
 $N_{\pi} = 201 \Rightarrow 0.3\%$

Question and remark

- The results are cut dependent. Why? Contamination in pion peaks with muons?
- I have processed enough data for all six points. They have the same behaviour.