

Pion contamination in Muon beam

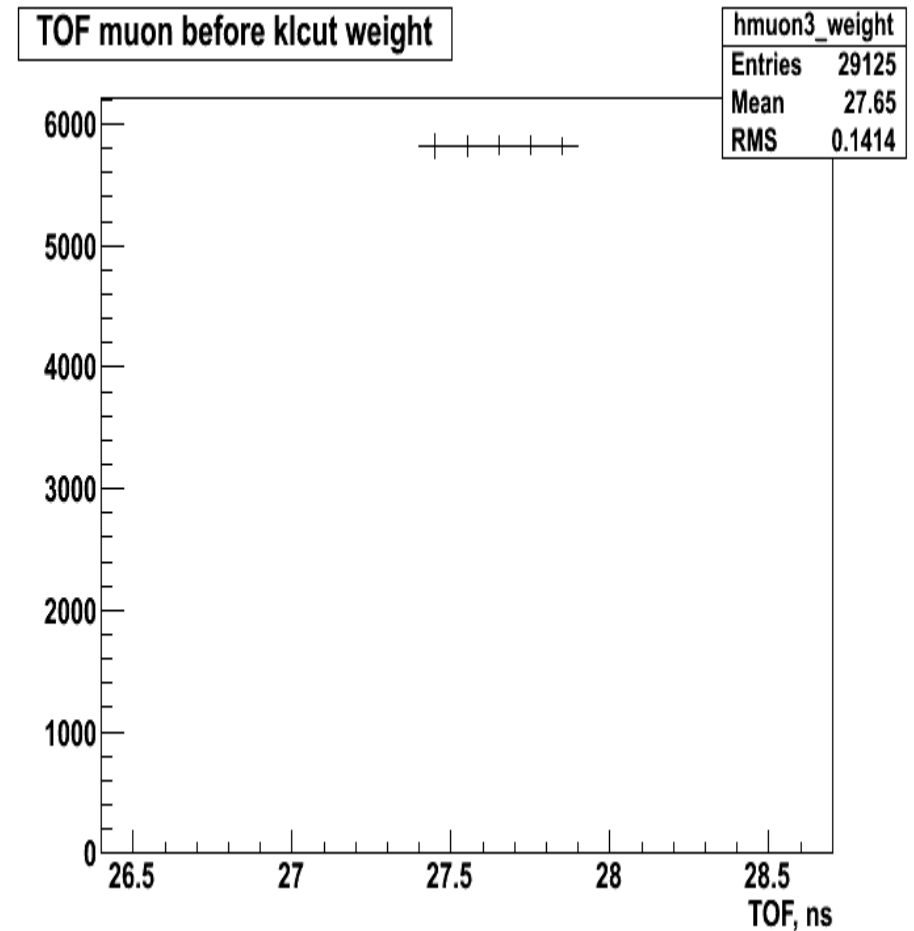
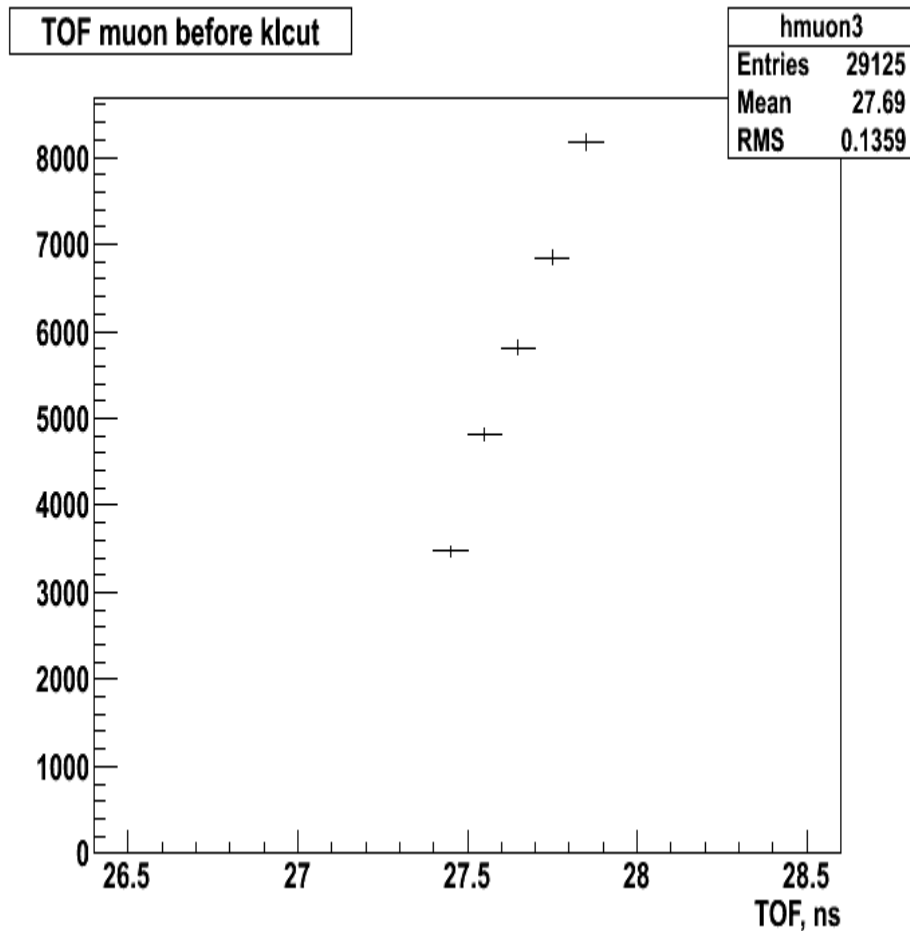
The (missing) effect of distribution reweighting

M.Bogomilov

22 March 2012

Reweighting procedure

Going from original TOF distribution before applying KL cut to flat distribution. The total number of events is kept to be the same. In this way the events in different bins have different weights.



Original distribution

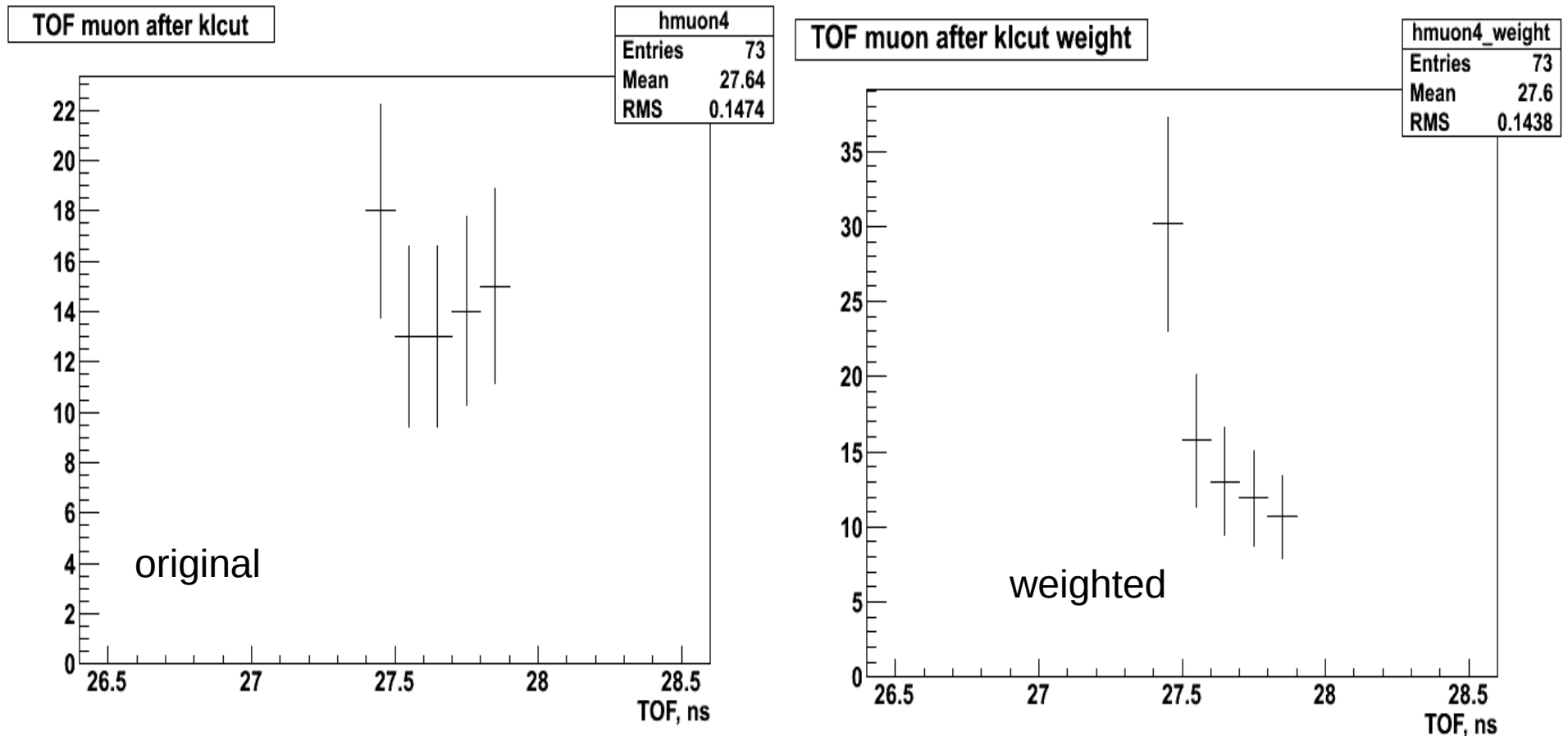


Flat distribution

2

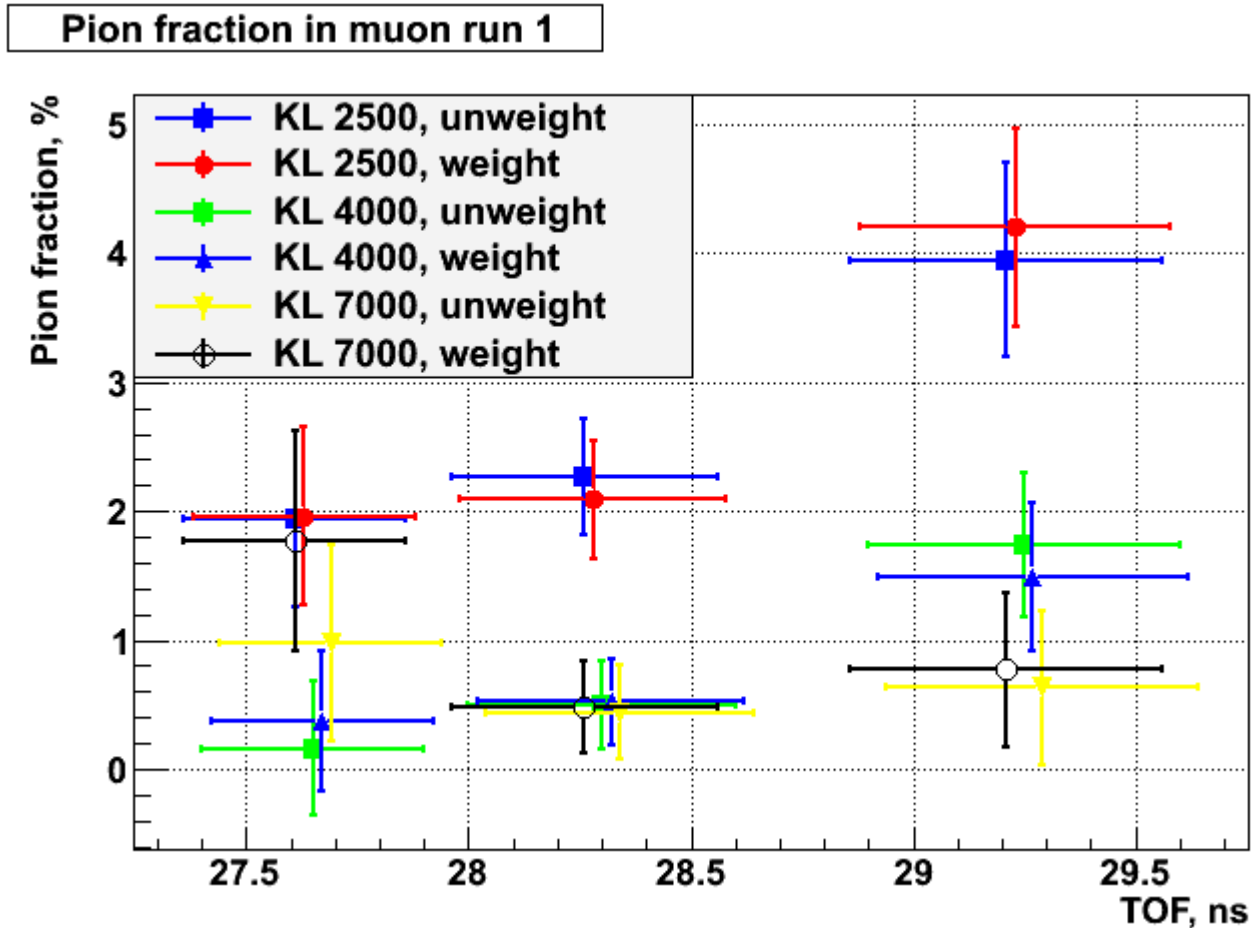
Reweighting procedure (cont).

Then apply KL cut on weighted histogram, and count the number of survived events.
(For comparison is given the original histogram after the cut too.)



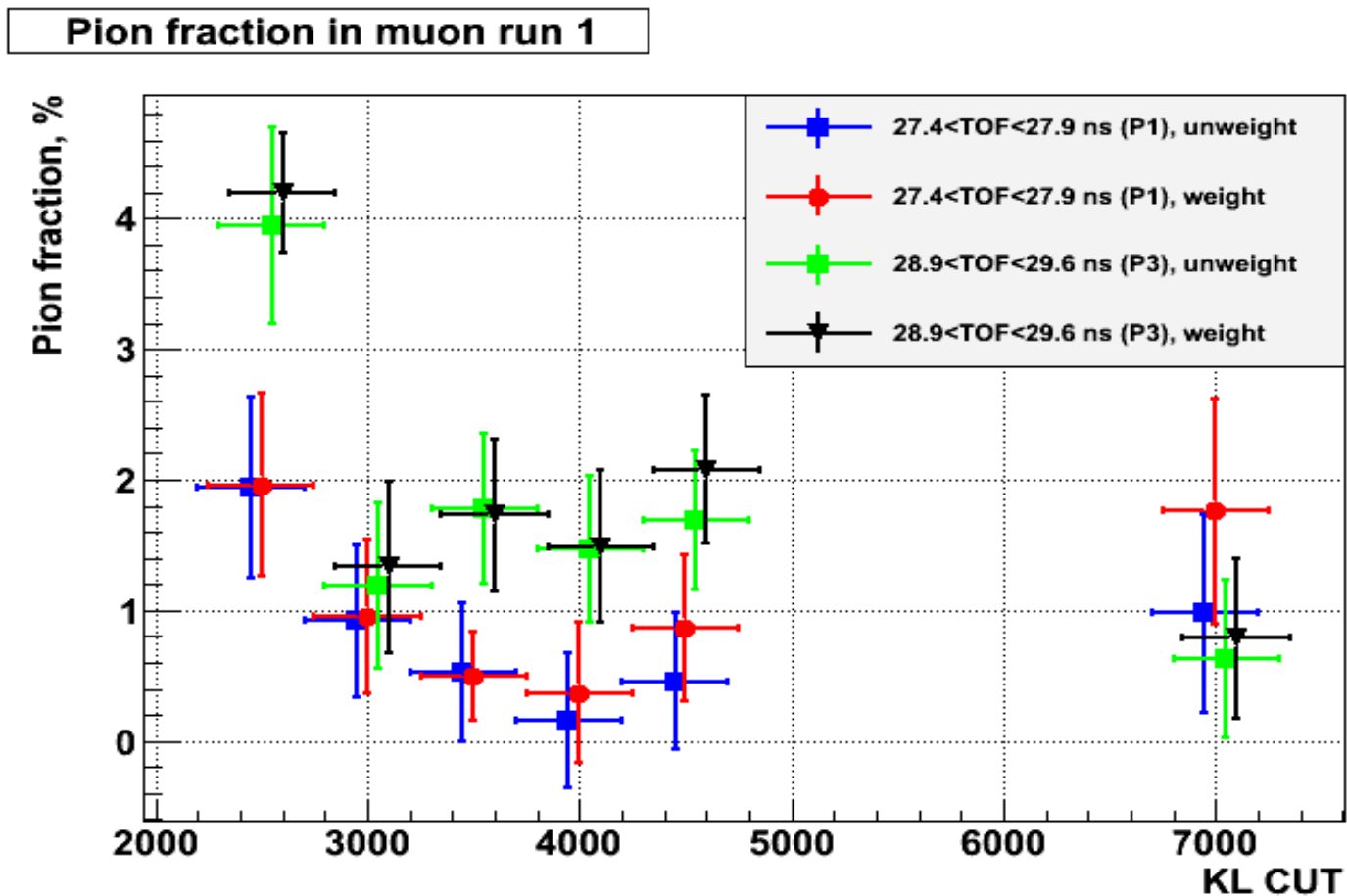
Note: The root statistics gives always the original number of events.
For example in this particular case, if one takes weights into account,
the sum of all bin is 81.5.

Results* for nominal muon setting



*The errors are about the be checked.

Results for nominal muon setting (cont.)



Conclusion

- The estimated pion fractions in weighted and un-weighted methods are the same. The difference is $\sim 0.2\%$. There is no preferred direction (\pm) of that difference.
- To do search for different systematics errors:
 - Binning
 - TOF window size
 - TOF window shift
 - What else?