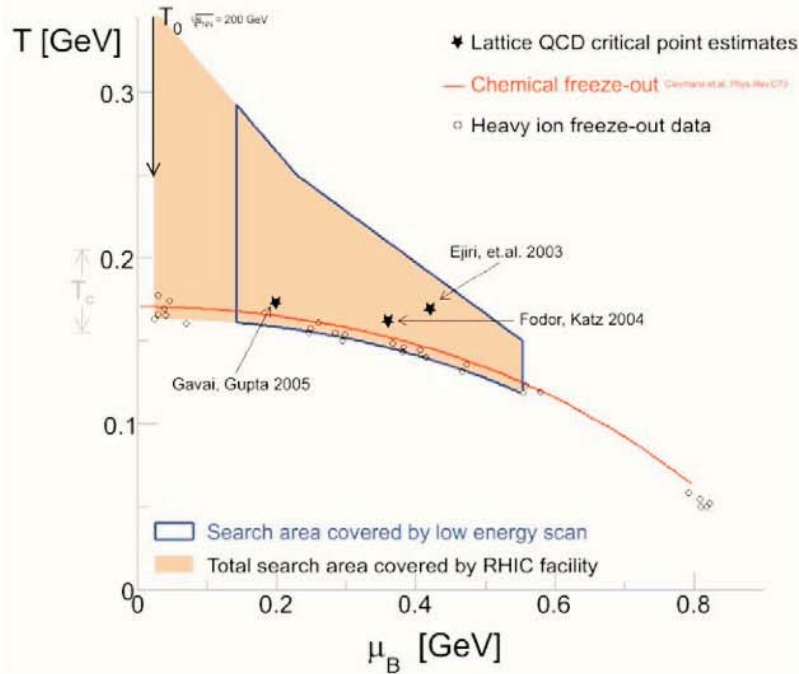# Run-8 Low Energy Run

W.J. Llope
☆ TOF Meeting
Austin, Texas
April 28, 2008

mix of Paul Sorensen's slides using my plots plus a few new ones
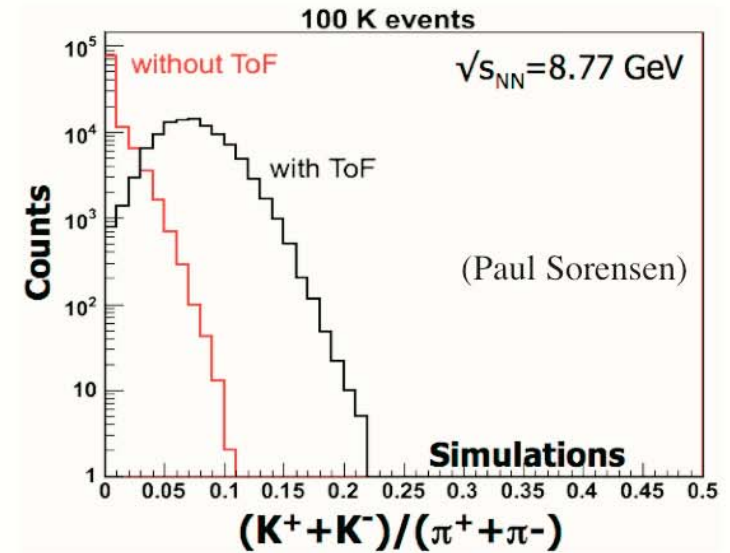
- physics motivation
- triggering &
  trigger problems
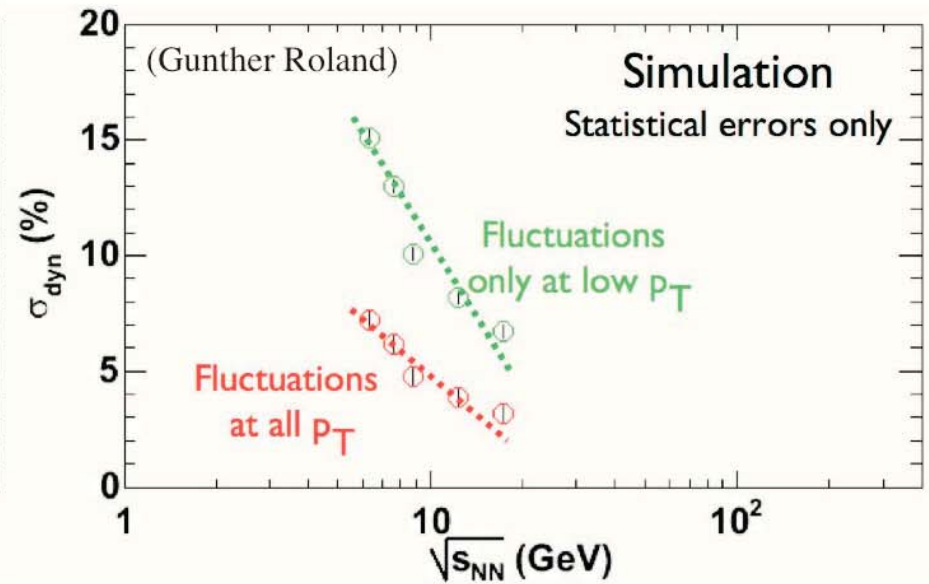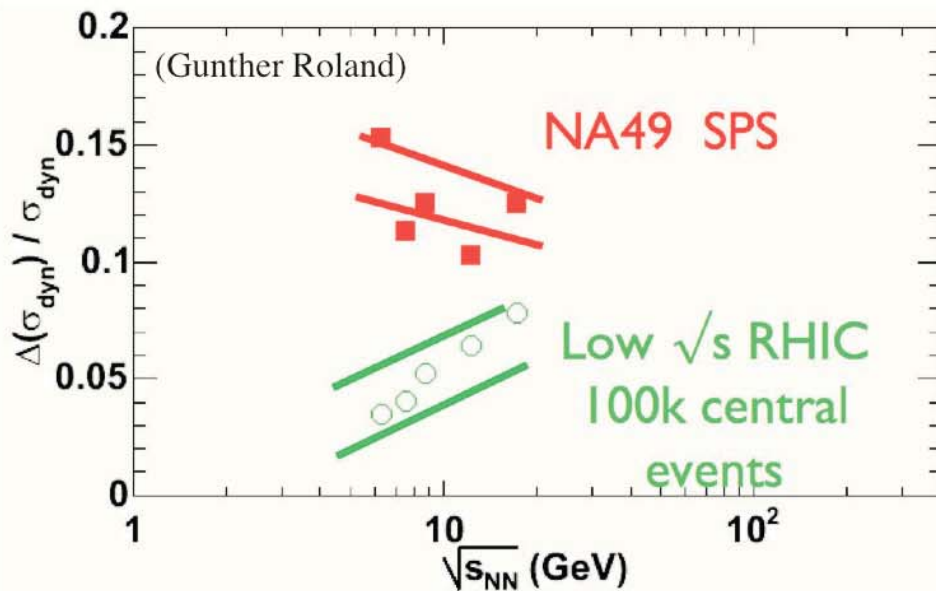- upVPD efficiency
- Zvtx from BBC &
  upVPD timing

Critical Point Search (Run-10)

concentrating here in the **K+/π+ "Horn"** seen at AGS/SPS energies
also of interest: v1 & v2, v2 fluctuations, <pT> fluctuations

0.5% mis-identification suppresses width by 5%
"signal" is of order ~4%

These assume the (2) benefits of a collider environment but also a nearly complete direct PID
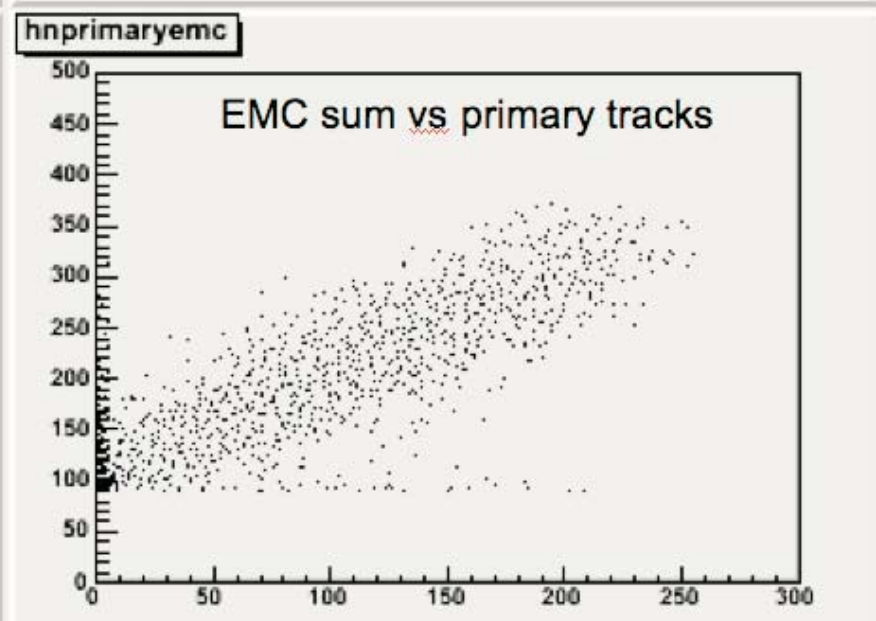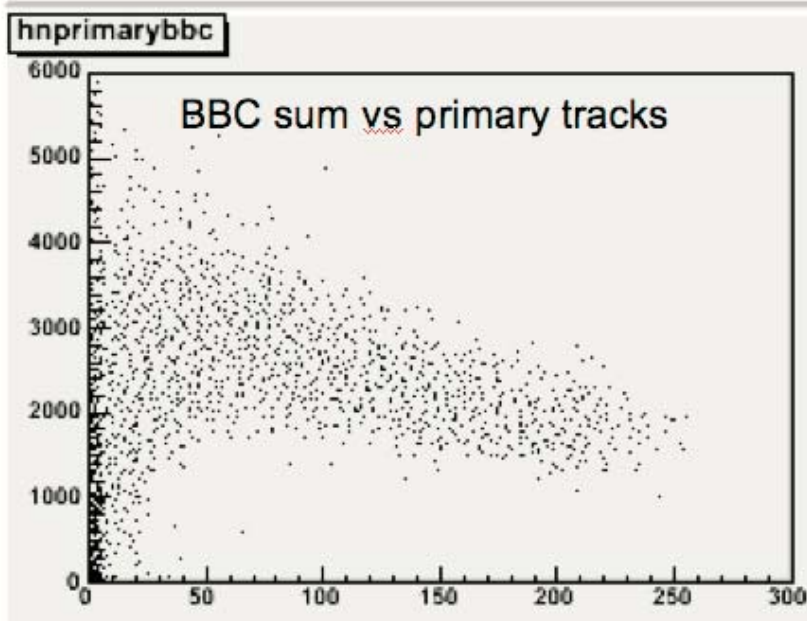
Run Totals-----------MARCH 11th 2008.

Run Label	Run Type	Runs	Events	Running Time(hrs)	% Questionable	Sampled Luminosity nb**-1
bbcvpd	Physics.	9	179974	3.86	0	
lowEnergy2008	Physics.	61	23142	7.07	0	
Totals		70	203116	10.93		

Trigger Totals

Trigger-Label	Run w/ Trg	Events
bbc	56	189638
bbc-ctb	51	7459
ctb	23	2426
VPD	20	8292
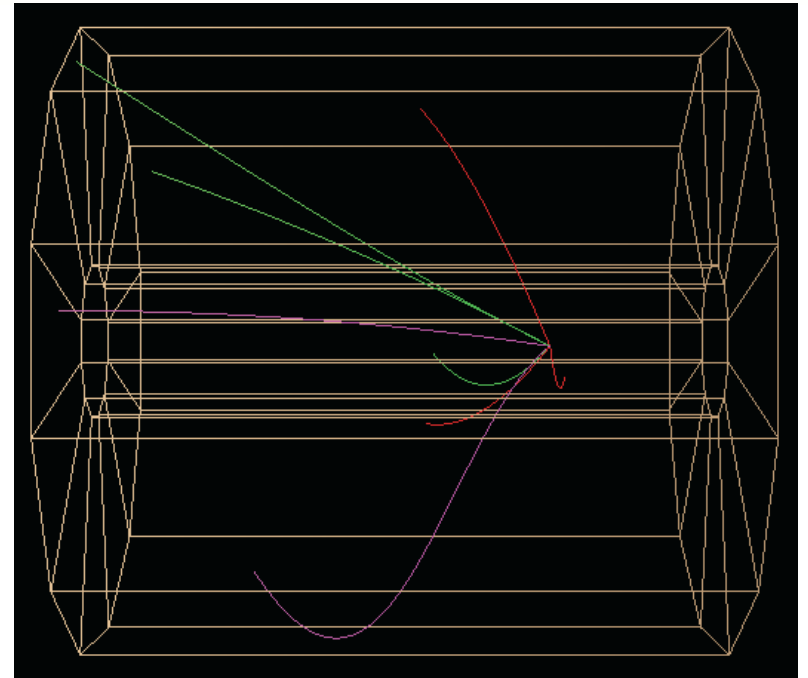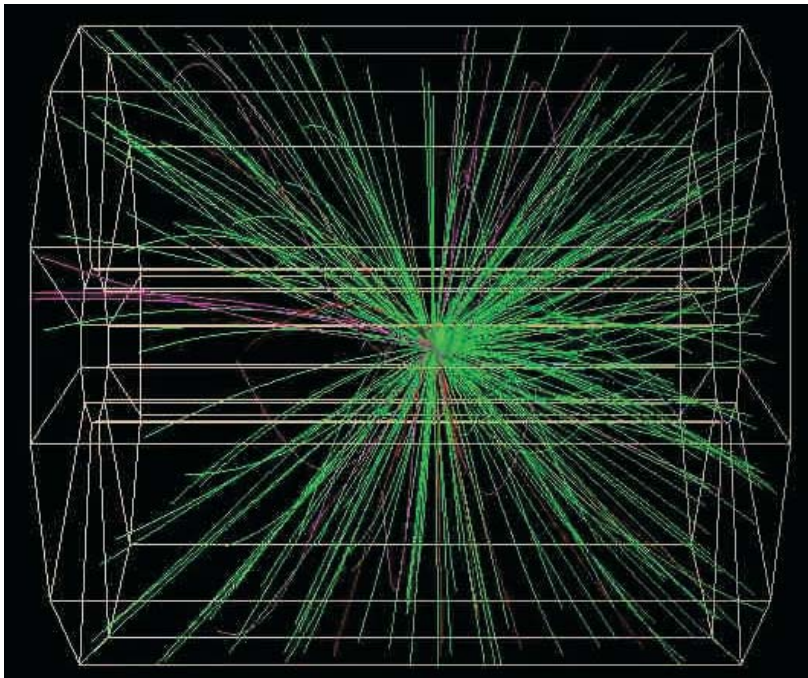
Fast Offline Study
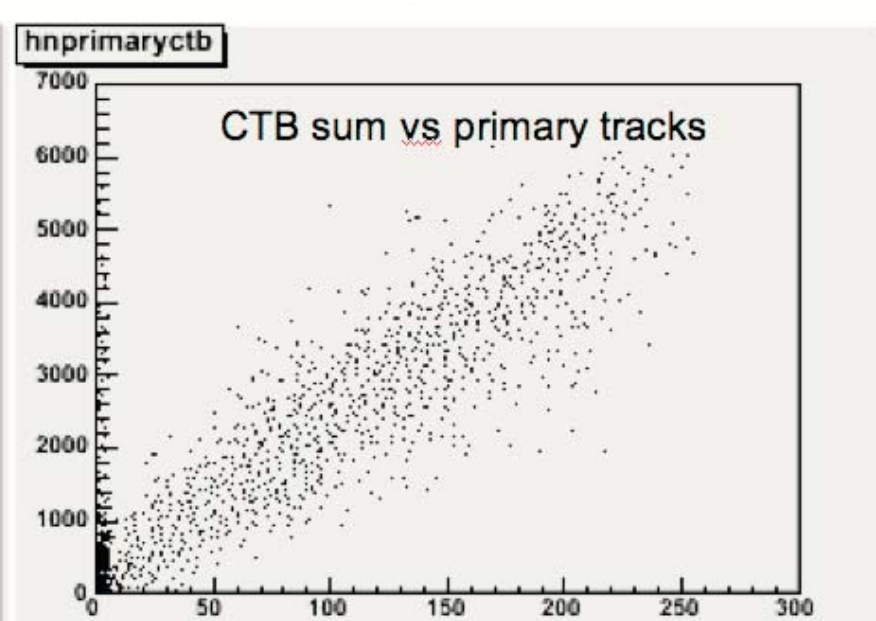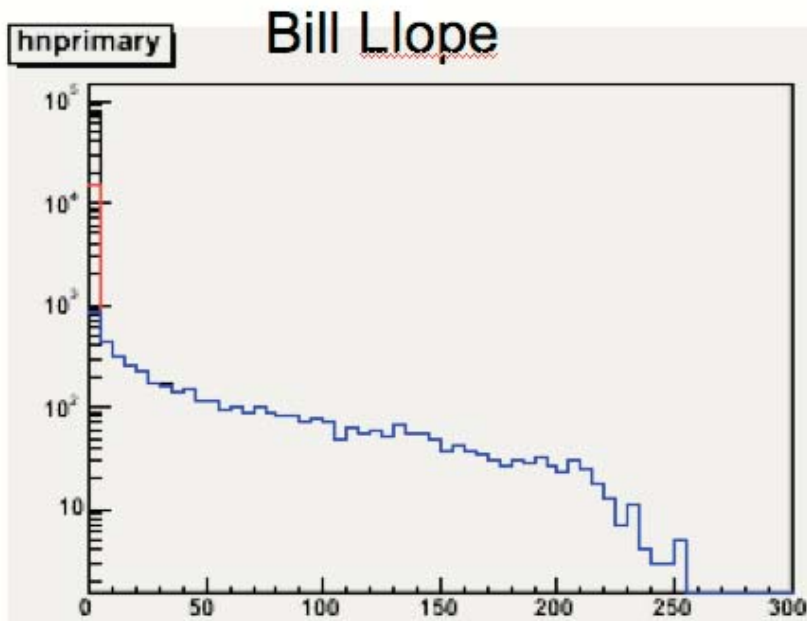
Bill Llope

Bill Llope's Numbers: We've got a problem

```
upVPD event rates, day 71, all events
events   :80263   1
1.or.1   :9050    0.112754
3.or.3   :4817    0.0600152
1.and.1  :5117    0.0637529
2.and.2  :2271    0.0282945
3.and.3  :980     0.0122099


upVPD event rates, day 71, nprimary>0
events   :  5616   1
1.or.1   :  5043   0.89797
3.or.3   :  3186   0.567308
1.and.1  :  3267   0.581731
2.and.2  :  1824   0.324786
3.and.3  :  857    0.1526


upVPD event rates, day 71, nprimary>0, run>=9071074
events   :  1421   1
1.or.1   :  1306   0.919071
3.or.3   :  781    0.549613
1.and.1  :  947    0.666432
2.and.2  :  467    0.328642
3.and.3  :  217    0.152709
```
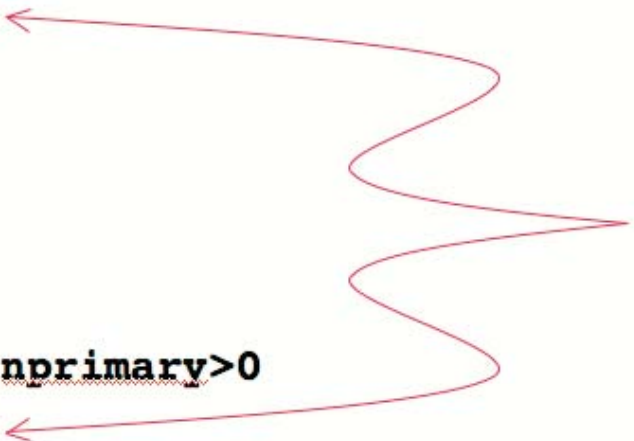
3% ?!

http://www.star.bnl.gov/HyperNews-star/get/startof/1392.html
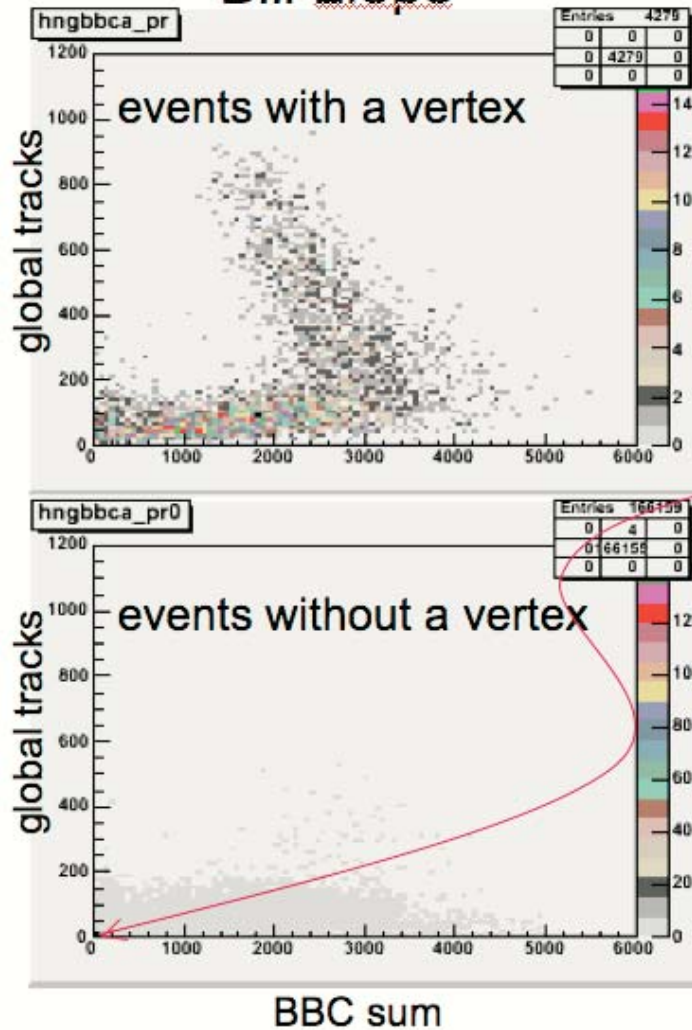
and events without anything !?
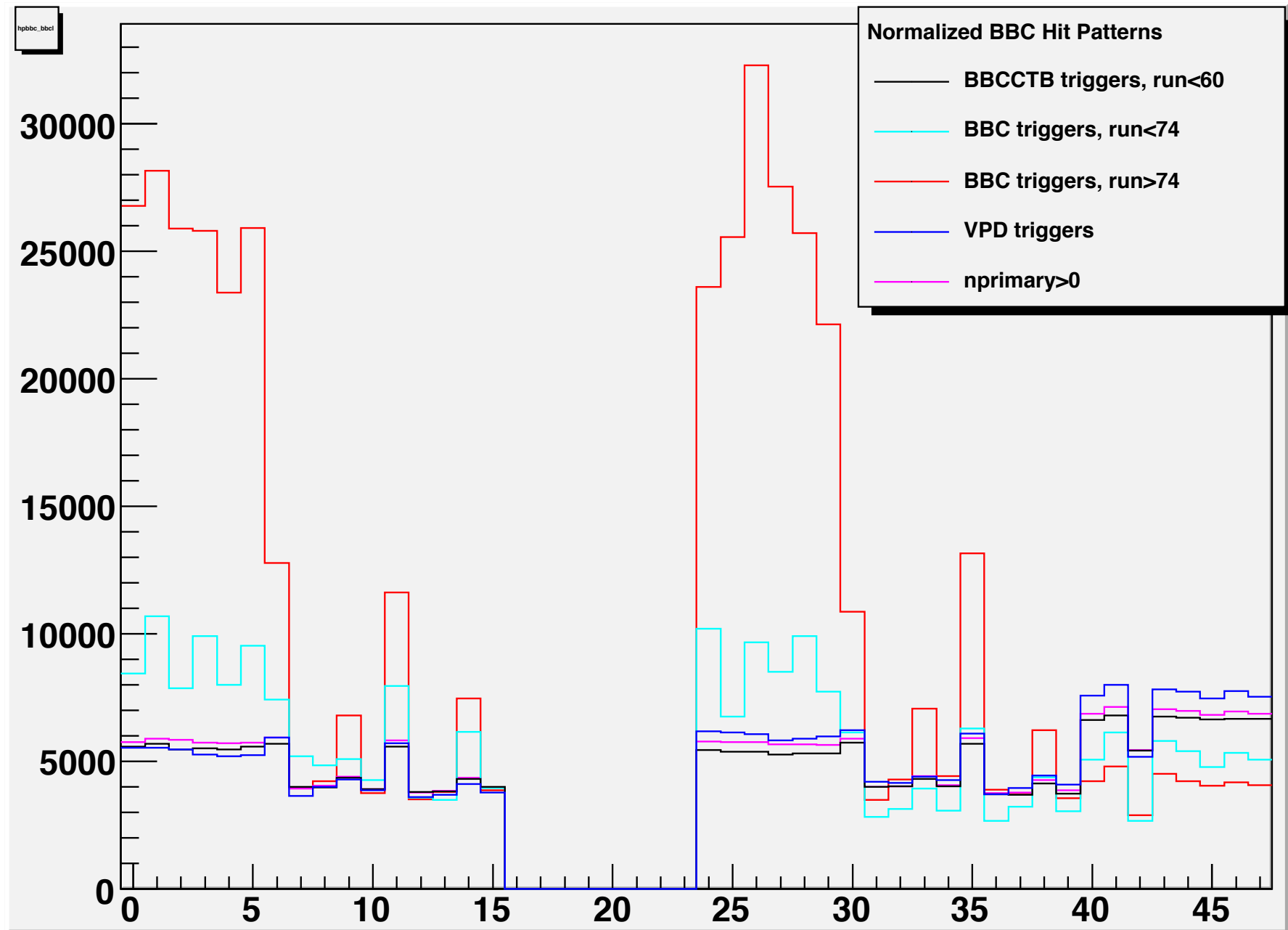
Bill Llope

Events without primaries:
- no correlation
- also BBC signal is zero

!!! but why so many with zero BBC and zero primaries ????

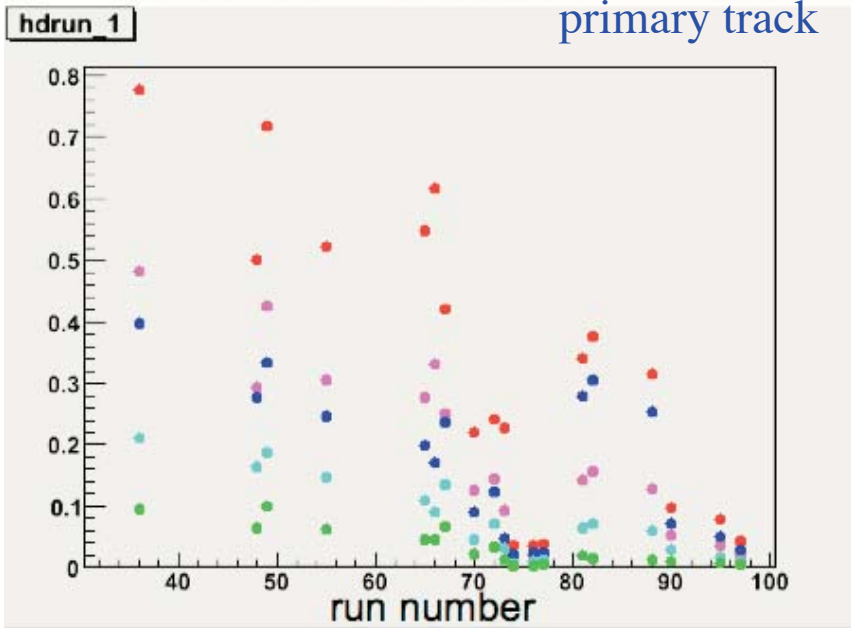~30% of the events should be good, not 6% as observed here
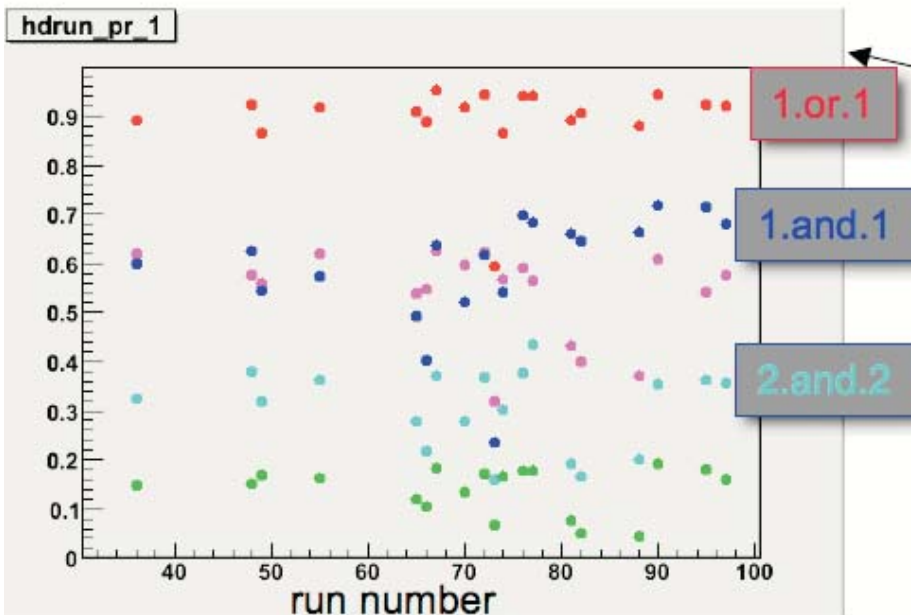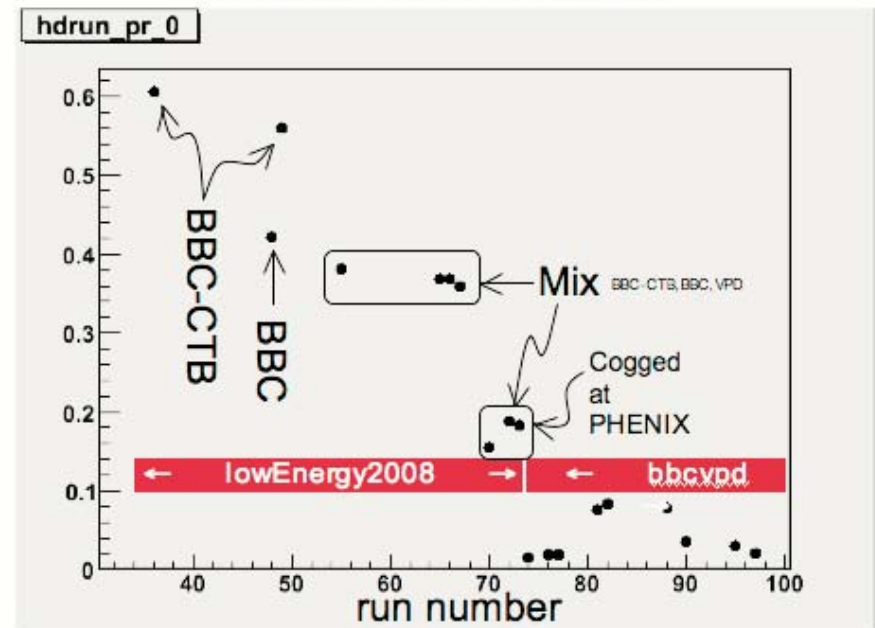
BBC Hit Patterns under various conditions....

hpbbc_bbcl

Normalized BBC Hit Patterns

- —— BBCCTB triggers, run<60
- —— BBC triggers, run<74
- —— BBC triggers, run>74
- —— VPD triggers
- —— nprimary>0

More from Bill Llopes VPD studies

probability to have a ~~vpd coincidence~~ primary track
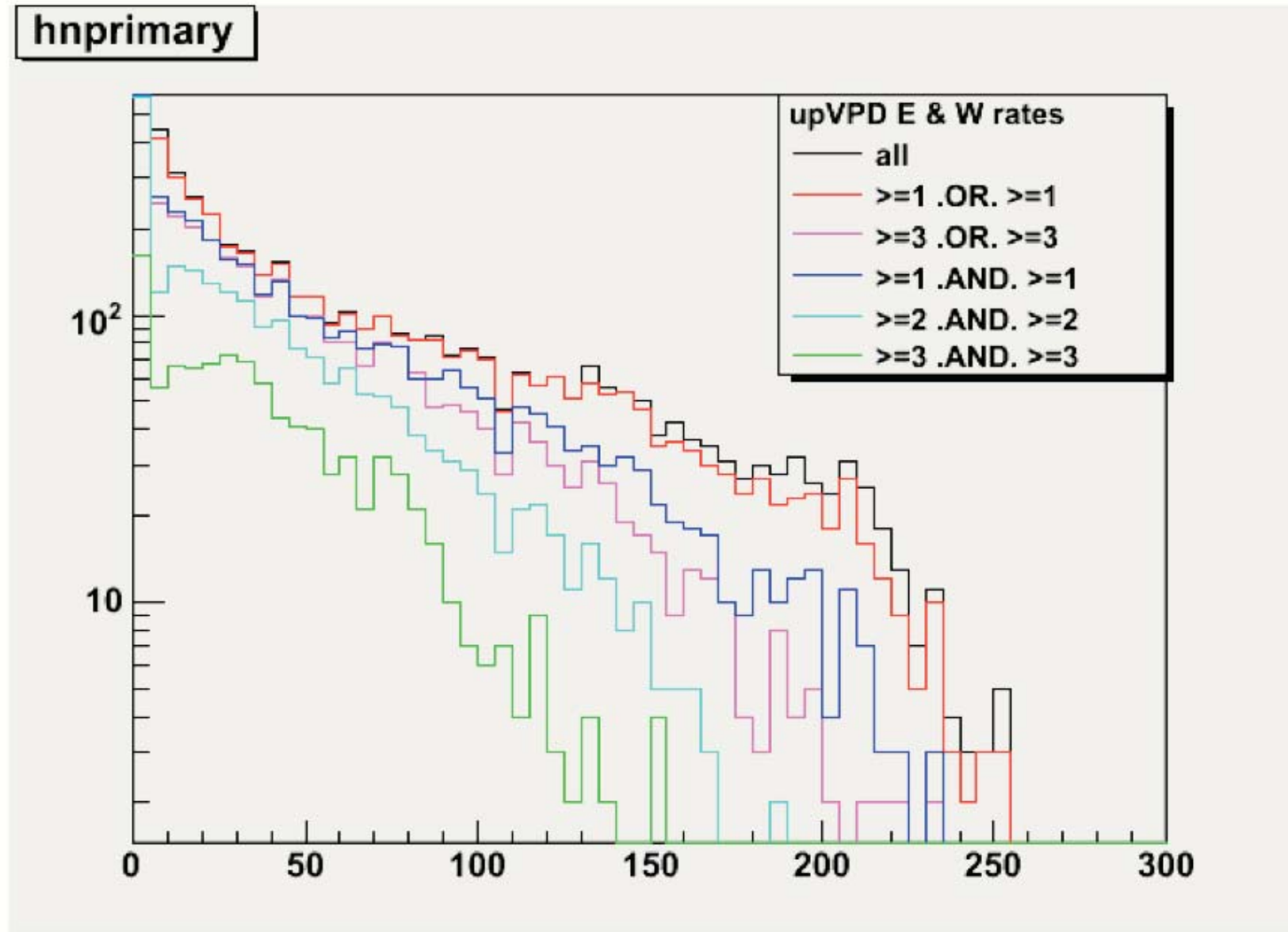
probability to have a vertex

of the events with a vertex, fraction having various VPD coincidences

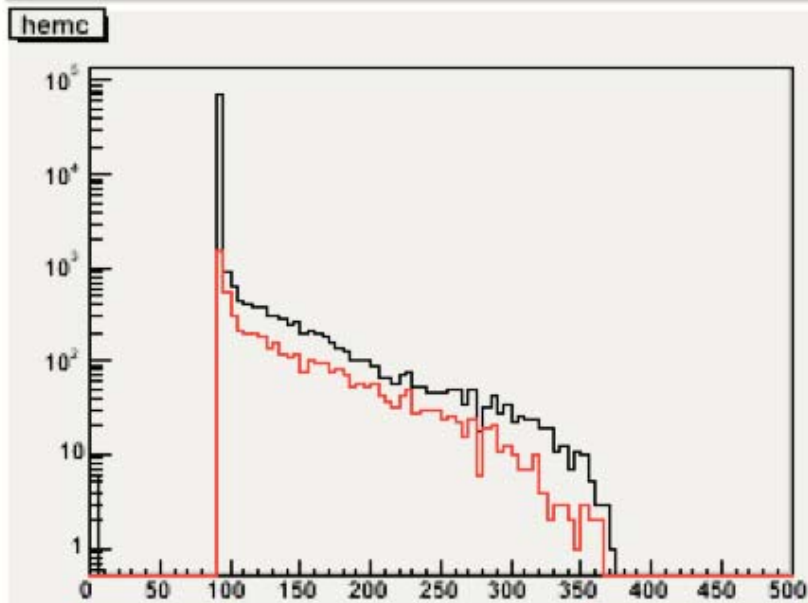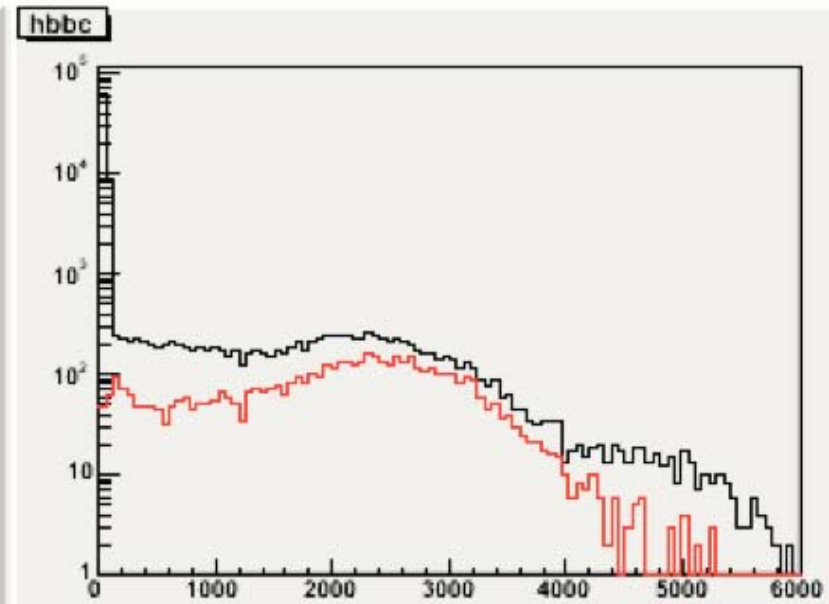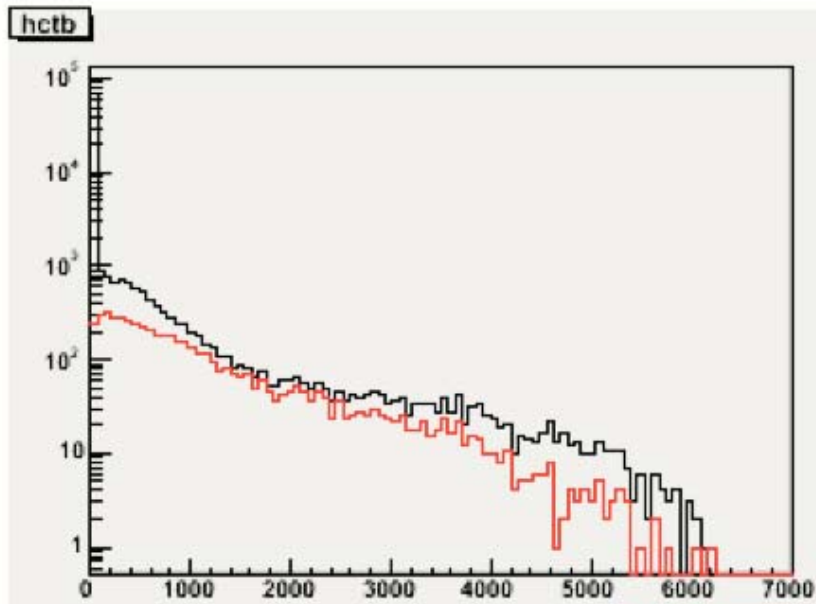Early runs are not triggered on VPD at all, so this gives us a good estimate of the VPD efficiency (60% for 1.and.1)

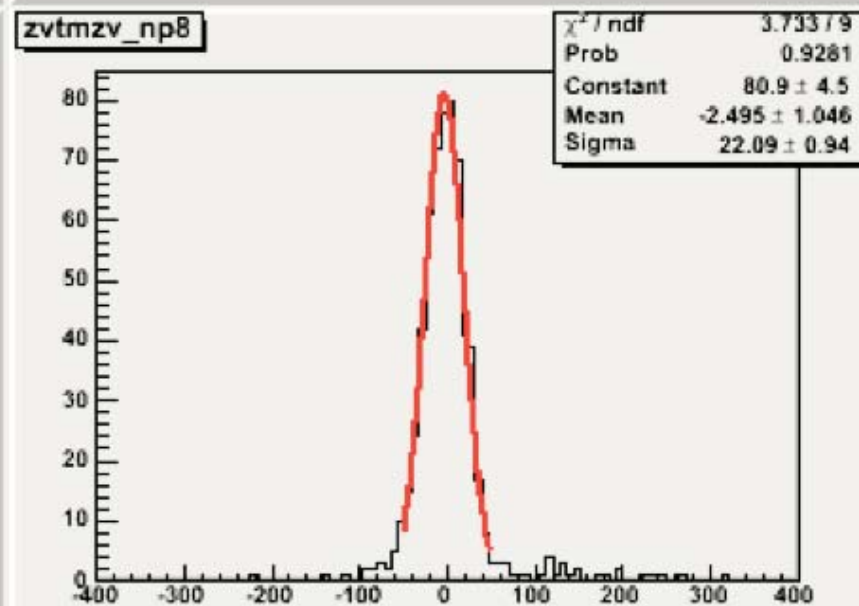Except for central events which may be lost by both VPD and BBC
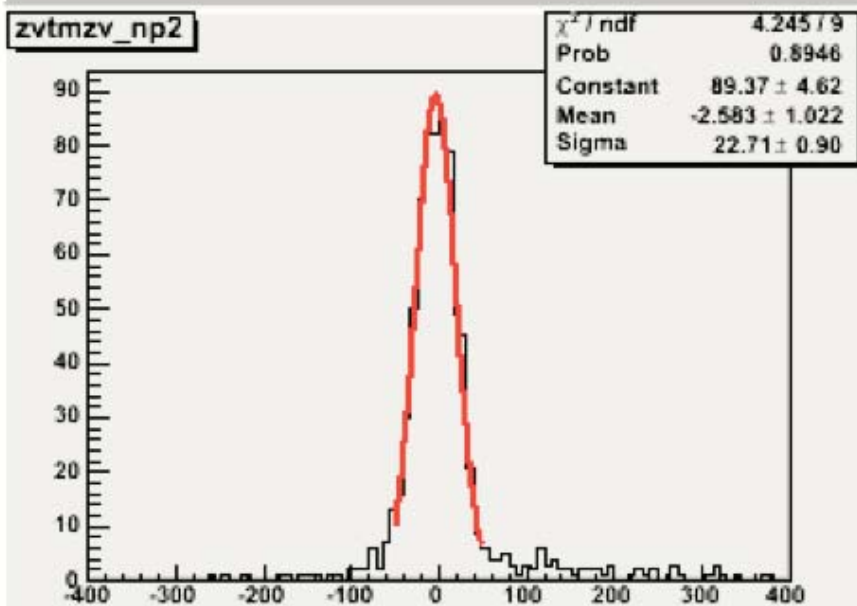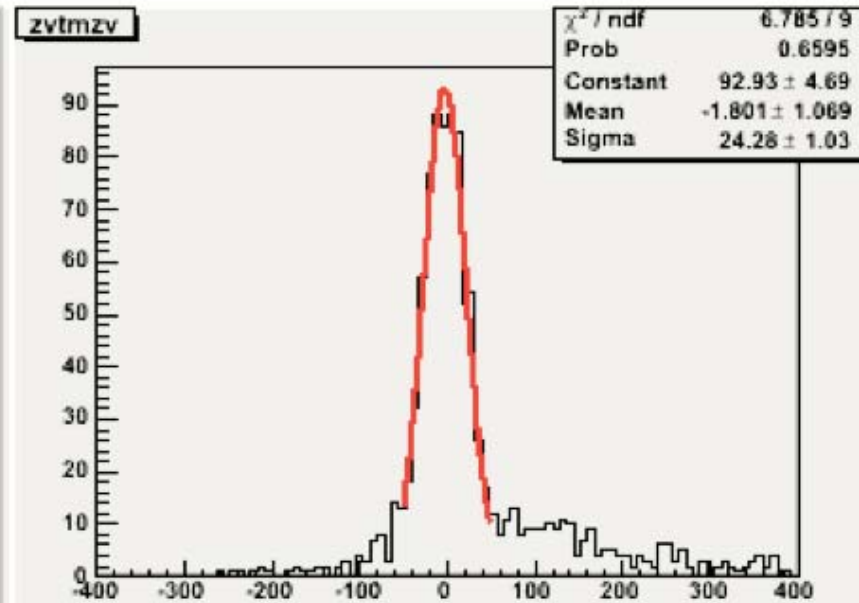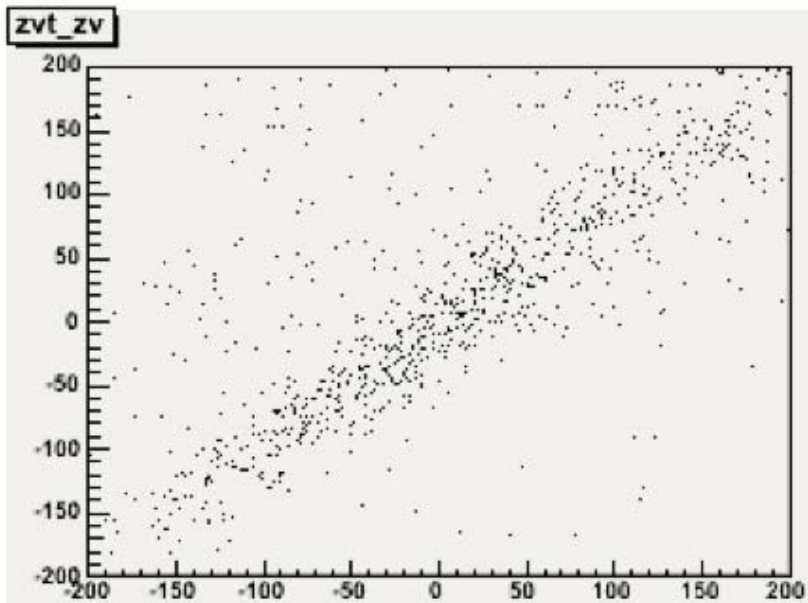
Bill Llope's Studies

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Bill Llope's Studies

Low Energy Test, Run-8, root(s) ~ 9 GeV

previous low energy test collected mostly beam-gas events
this test:
    bbc trigger - collected empty events
                   - excess count rate in inner 6 BBC chs on each side
                   - no explanation yet
    ctb trigger - worked well
    vpd trigger - worked well

some confusion re: event quality from control room event display...
    (only VPD triggered events went to display!)

unbiased upVPD 1.and.1 coincidence efficiency/event ~ 60% !!

loses efficiency for most peripheral and most central events
    in central events TOF doesn't need upVPD
        can reconstruct start-time from the stop-times very precisely....

strong correlations between timing Zvtx and tracking Zvtx
    from both upVPD (105ps/bin) and BBC (165 ps/bin)

much more successful run than before. ~10k evts for analyses...