Run-8 upVPD Calibrations

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

Outline:

- Method
- Events
- Results

Plotting std. dev. of "1-<N>" is *not* enough!

step 1

read, unpack, apply INL, convert to nanoseconds
apply cabling offsets from jianhang's map
apply "clean-up" offsets (+/- 2ns)
apply E/W phase correction
apply +/-60ns gate w.r.t. trigger time
keep only earliest hit in each channel
require ToT>0 and ToT<50ns
save to new TTree

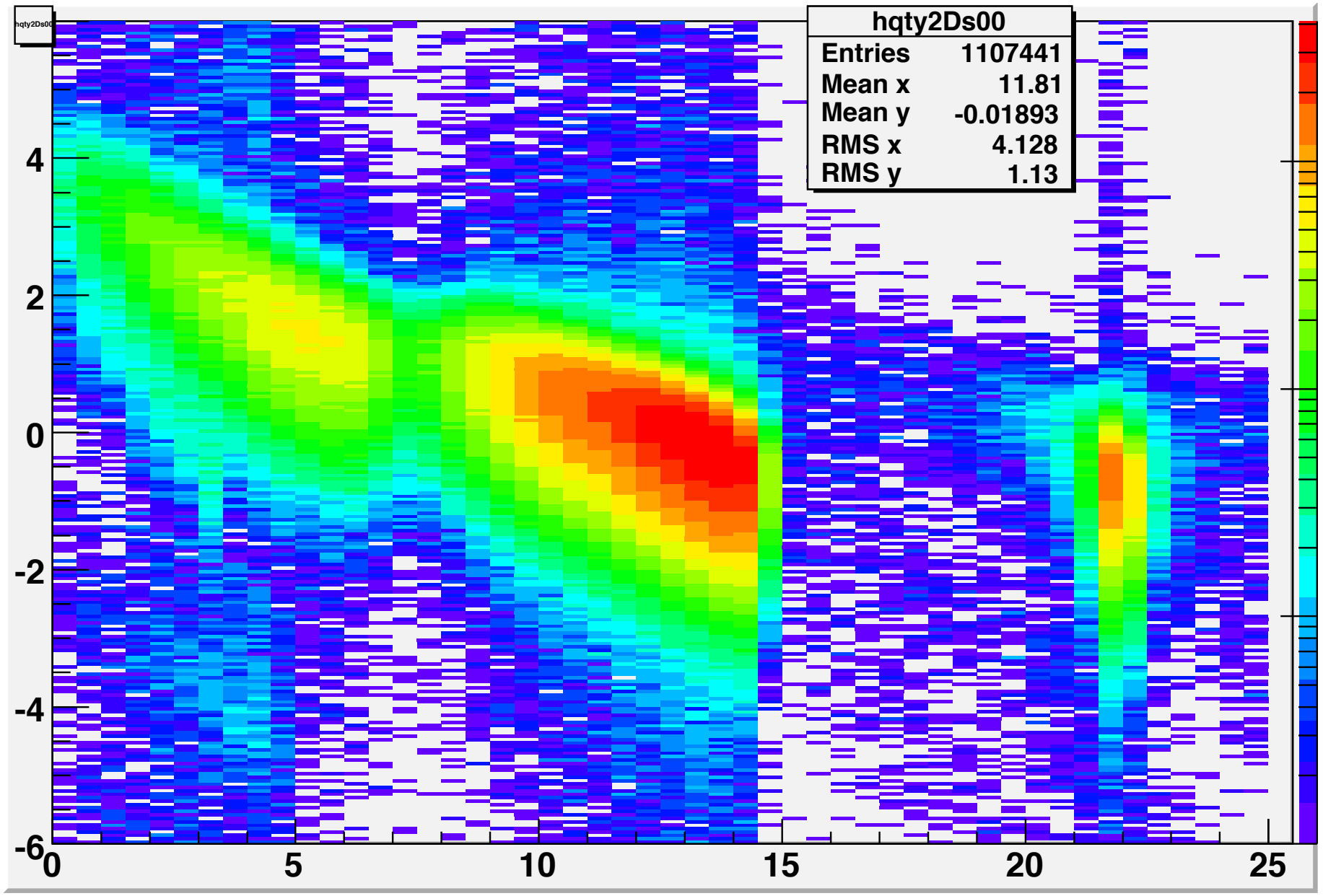
step 2

do (Ncycles*19 + 1) passes
in each pass, E and W in parallel
apply existing correction function from previous passes
if N(e/w)>=3
form "qty": 1-<N> vs ToT in "1" channel
allow all N
post pass fit with 9 par polynomial
update correction function

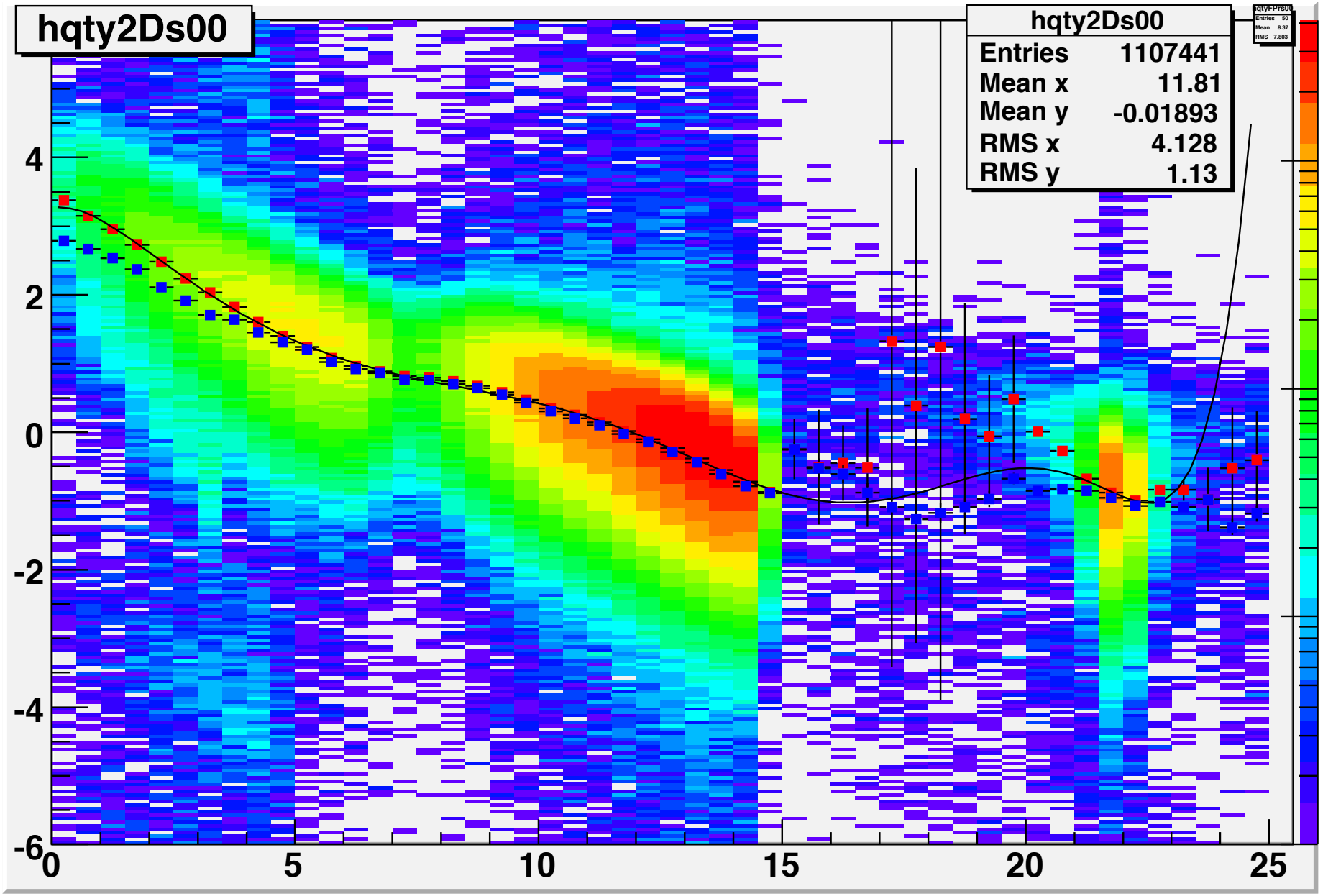
many variants: require Ncal=3, vary IDs in "<2>" avg etc etc

Run List

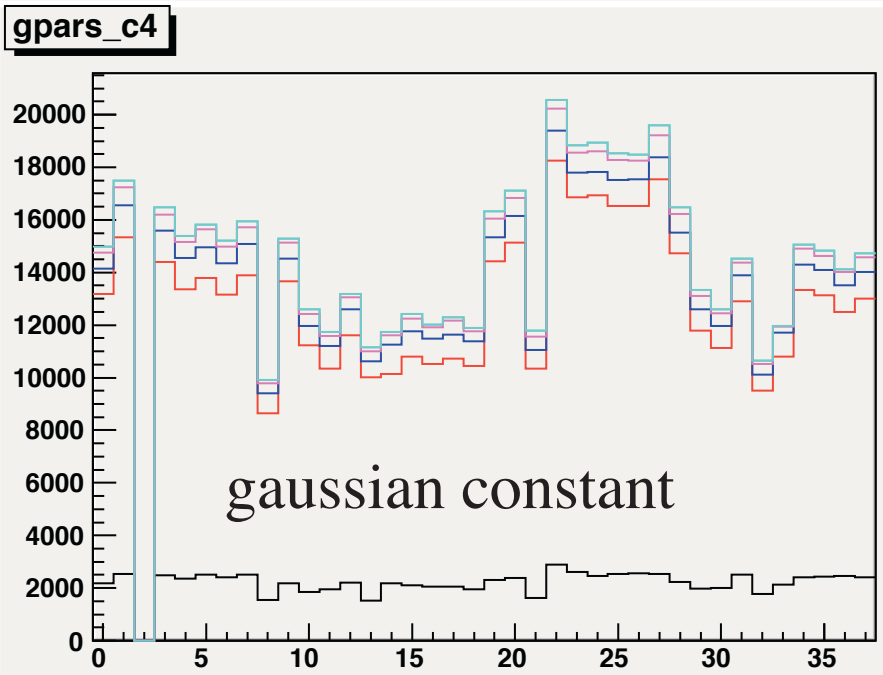
d+Au	p+p
9026014	9042025
9026018	9042027
9026024	9042034
9026025	9042038
9026029	9042039
9026030	9042072
9026031	9043035
9026037	9043036
9026068	9043040
9026076	9043045
9026080	9043061
9026096	9044023
9026097	9044034
9027001	9044035
9027009	9045006
9027010	9046009
9027025	9046015
9027034	9046024
9027035	9046025
9027036	9046030
9027039	9053115
9027040	9053116
9027054	9053117
9027062	9054058
9027063	9054059
9027064	
9027074	
9027077	
9027078	
9027085	
9027086	
TOF Events: 2,222,586	1,875,112

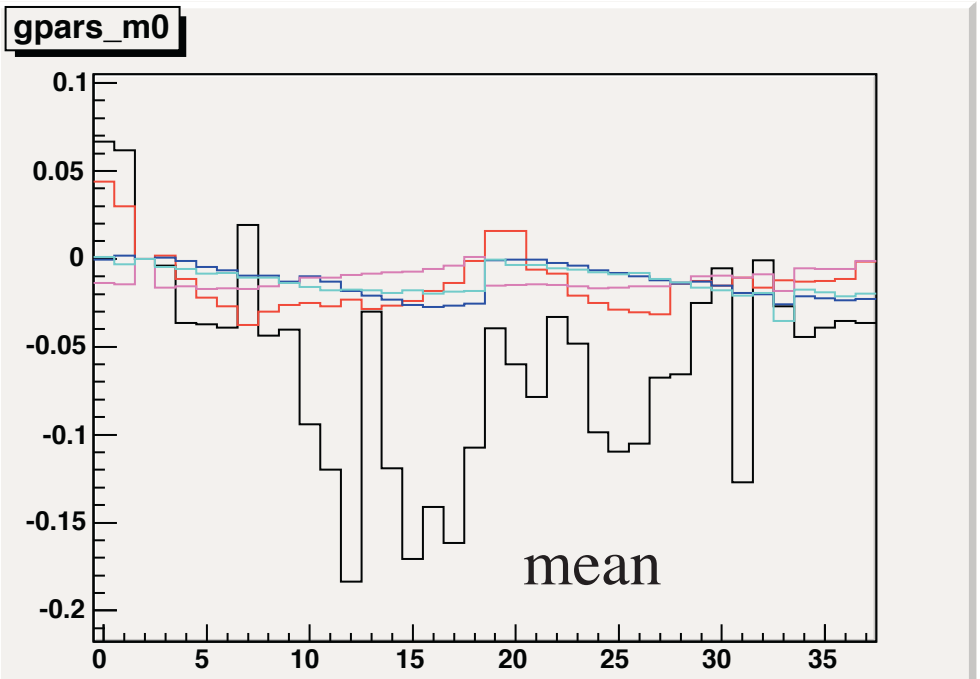


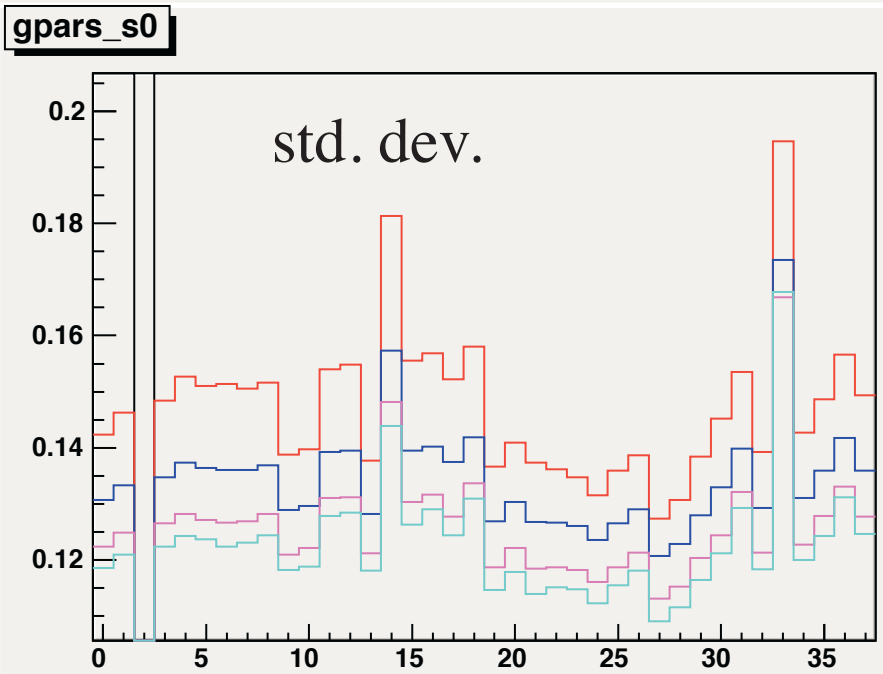
Multiple peaks in ToT... (under investigation)
can be fit but not “well”



FitSlicesY works better than Profile at low ToT (low stats)...
extra bumps...

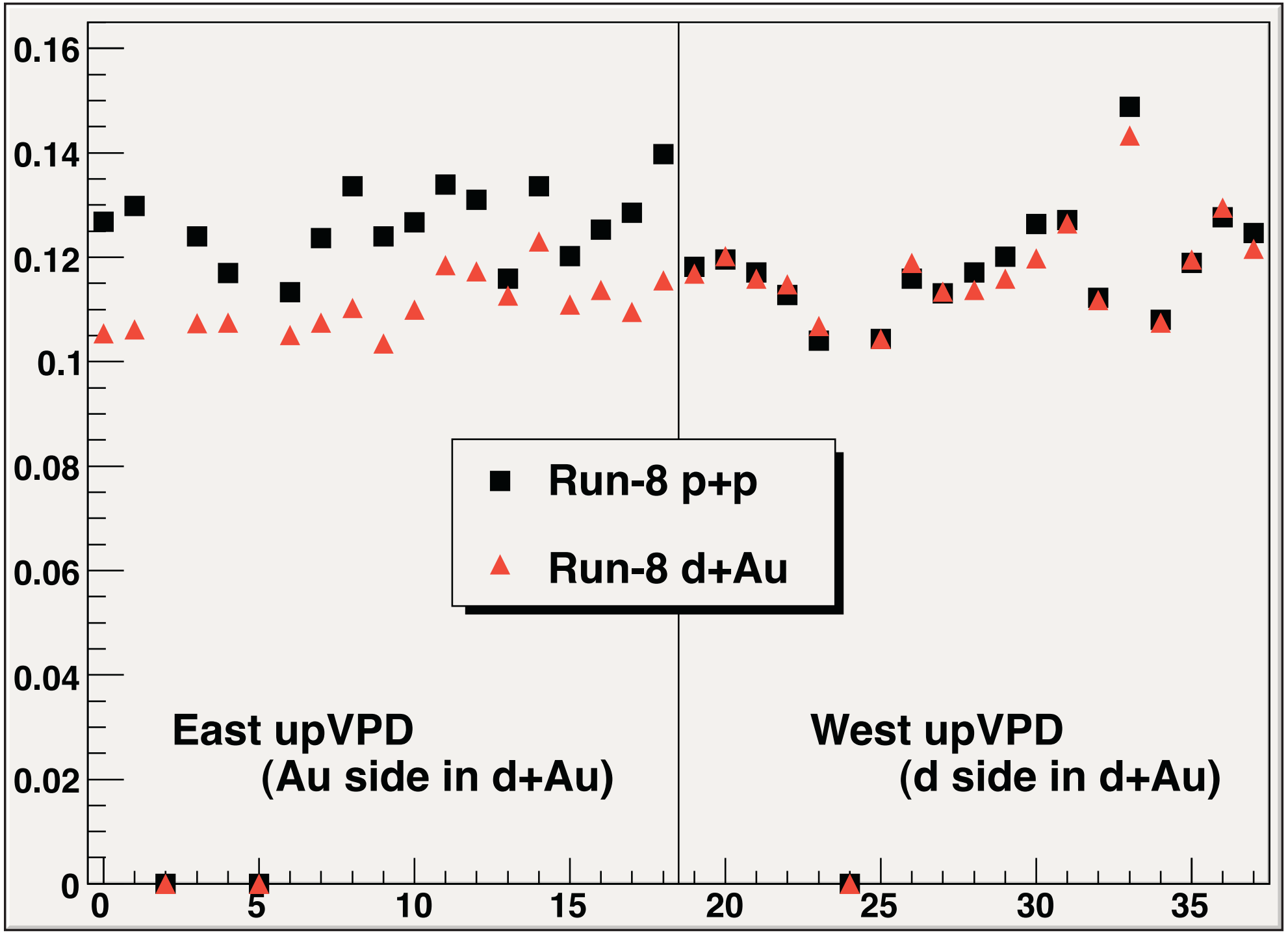


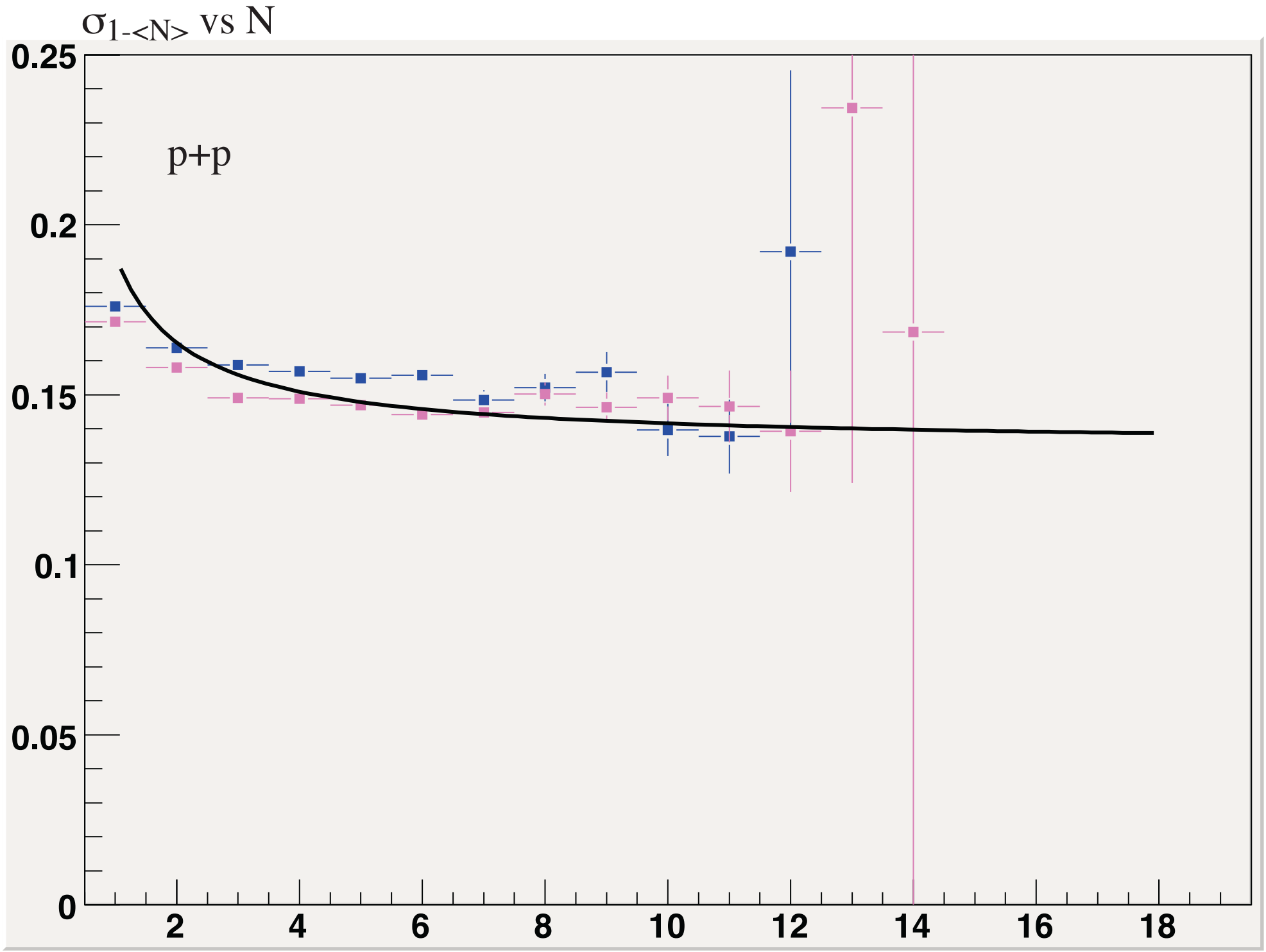


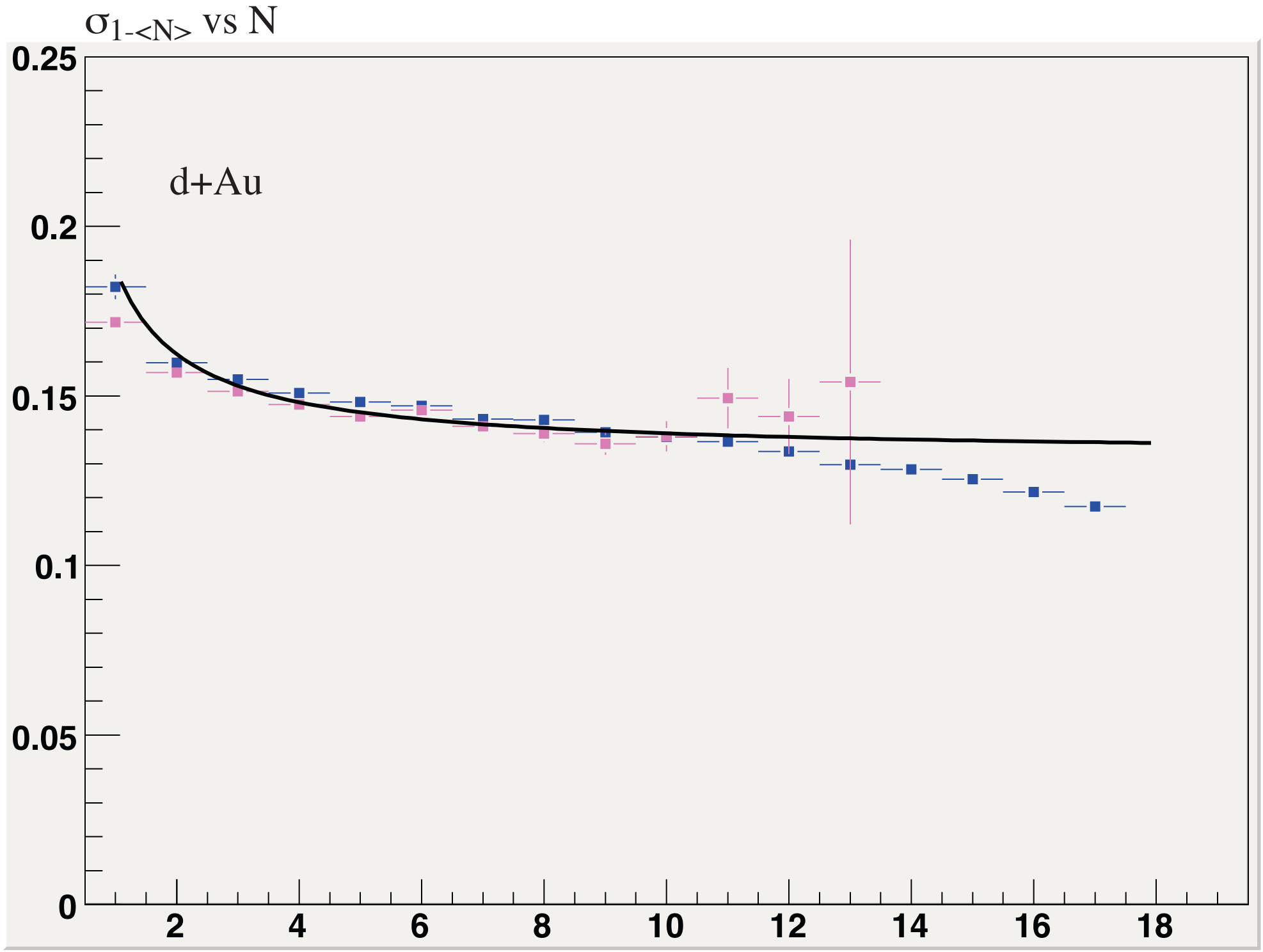


p+p

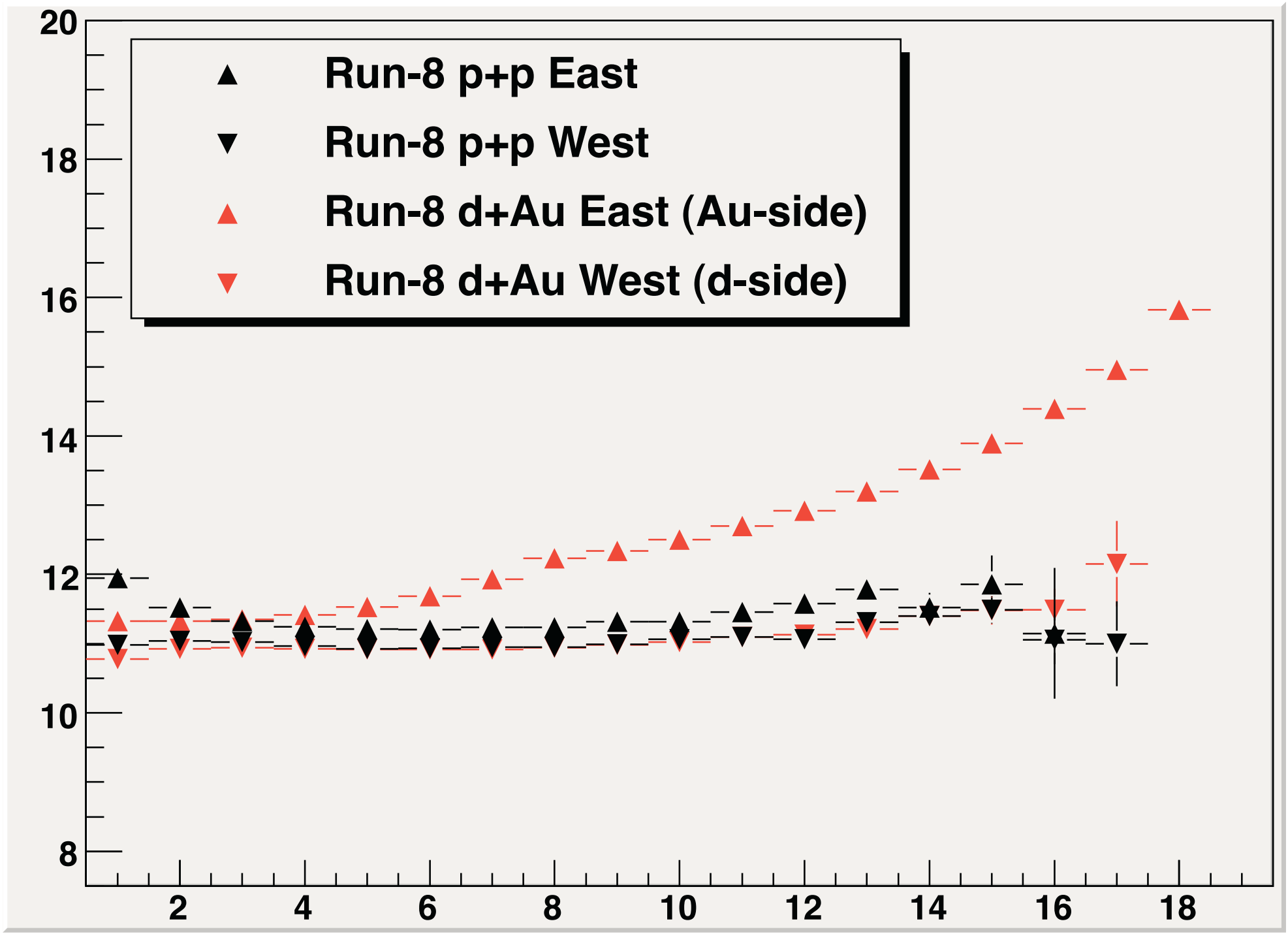
77 passes (4 cycles + 1)


0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0
5
10
15
20
25
30
35
Run-8 p+p
Run-8 d+Au
East upVPD
(Au side in d+Au)
West upVPD
(d side in d+Au)


$\sigma_{1-<N>}$ vs N
p+p
0.25
0.2
0.15
0.1
0.05
0
2
4
6
8
10
12
14
16
18


$\sigma_{1-<N>}$ vs N
d+Au
0.25
0.2
0.15
0.1
0.05
0
2
4
6
8
10
12
14
16
18

East Side in d+Au starts to see Multi-particle/detector timing!



Single detector resolution is only half of the equation

Offsets must also be under control
as Teast, Twest, & Tstart are *averages* over lit channels in the event

if offsets are under control:

$\sigma_{1-<N>}$ vs N approaches constant at large N (single detector resn, σ_o)

N=2 point is $\sqrt{(3/2)}$ higher than σ_o

in some cases, I saw σ_{side} *increase* with N, even though "resn" O.K.!

if "1-<N>" has correct trend, then

$\sigma_{side} \sim \sigma_o / \sqrt{N_{side}}$

and

$\sigma_{start} \sim [\sigma_{east} / \sqrt{N_{east}}]$ (+) $[\sigma_{west} / \sqrt{N_{west}}]$

at present $\sigma_o \sim 140$ps

My offsets are *almost* under control. Still concerned about low-N behavior....
stay tuned....

Challenge to all upVPD calibrators - show $\sigma_{1-<N>}$ vs N *!!*