

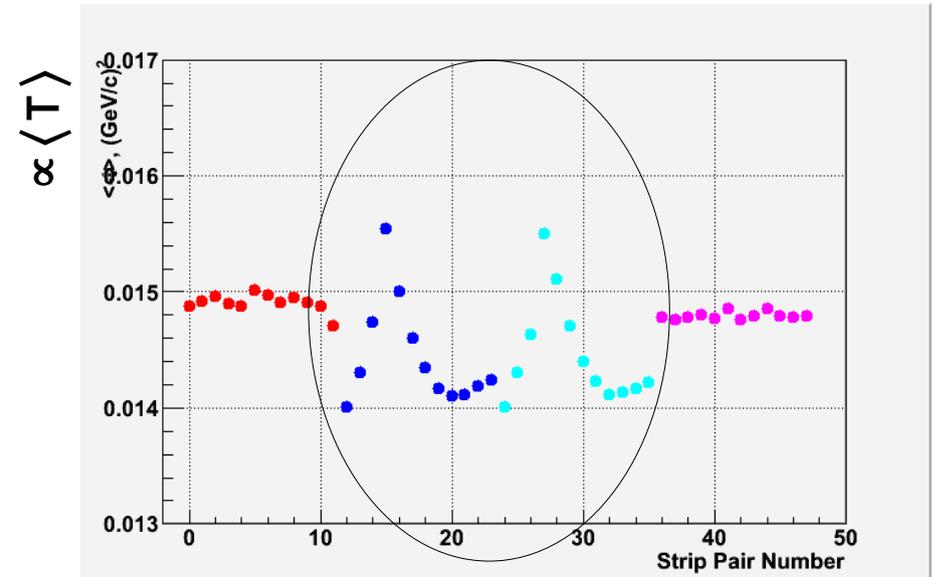
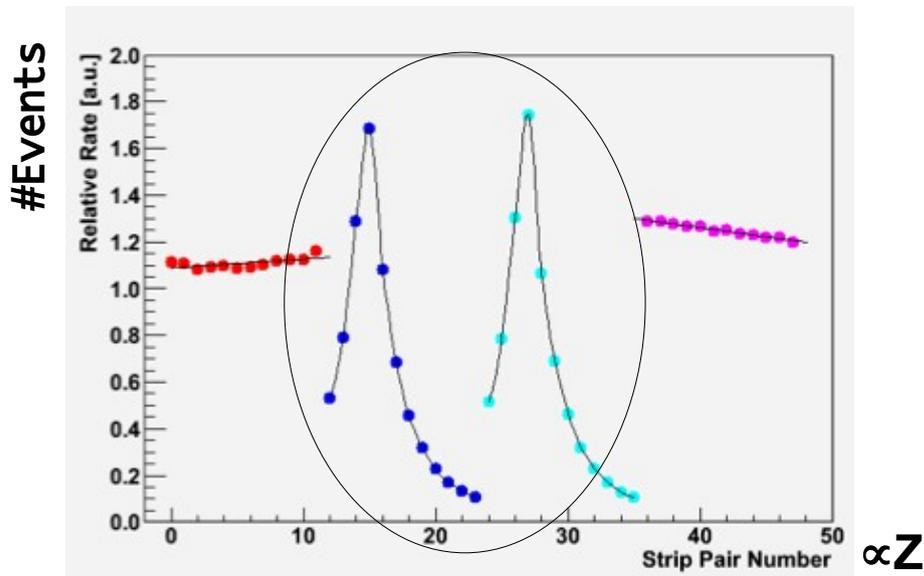
RUN12 plans: rotate BNL det.

Extra slide: other Run12 issues

polar mtg.
05.10.11

Rotated detectors:

- Presently RHIC polar. detectors segmented azimuthally
- From longitudinal distributions:
info on multiple scattering \Rightarrow E-loss in target
- e.g. AGG long. seg. detectors (Andrei):

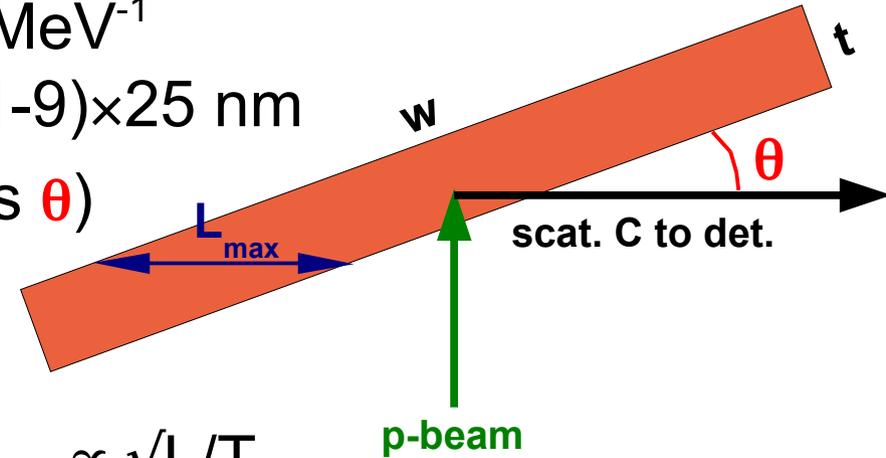


- Can we make use of this info in RHIC polar.?

Simple simulation

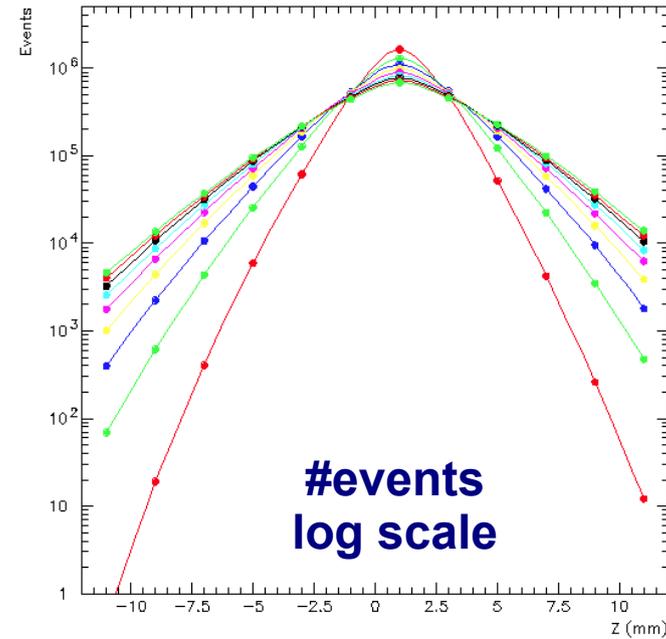
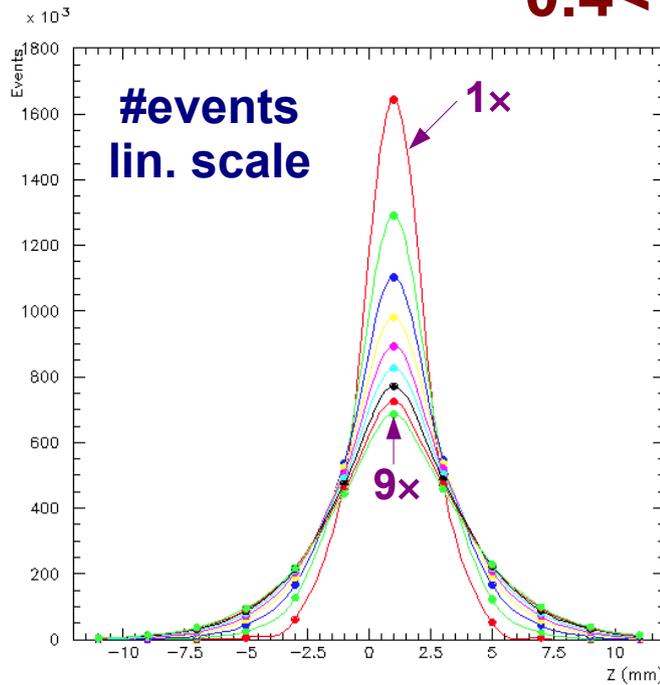
Like RHIC pC polarimeters, rotated:

- Detector 18 cm from beam
- 12 segments along 24 mm of beam axis
- Generate events $dN/dT \propto e^{-BT}$, $B = 2.2 \text{ MeV}^{-1}$
- Maximum paths lengths in target $L_{\text{max}} = (1-9) \times 25 \text{ nm}$
(covers various thickness targets, angles θ)
- Actual path length $0 < L < L_{\text{max}}$
(scattering anywhere across target)
- Multiple scattering through L material: $\theta_{\text{RMS}} \propto \sqrt{L/T_{\text{scat}}}$
mult. scat. params from PDG; valid this low T?
- Energy loss through L material: $T_{\text{scat}} \rightarrow T_{\text{det}}$
- After E-loss detect ^{12}C with $0.4 < T_{\text{det}} < 0.9 \text{ MeV}$
- For these events consider for various L_{max} :
 - # events per (2 mm wide) channel
 - mean $\langle T_{\text{det}} \rangle$ per channel

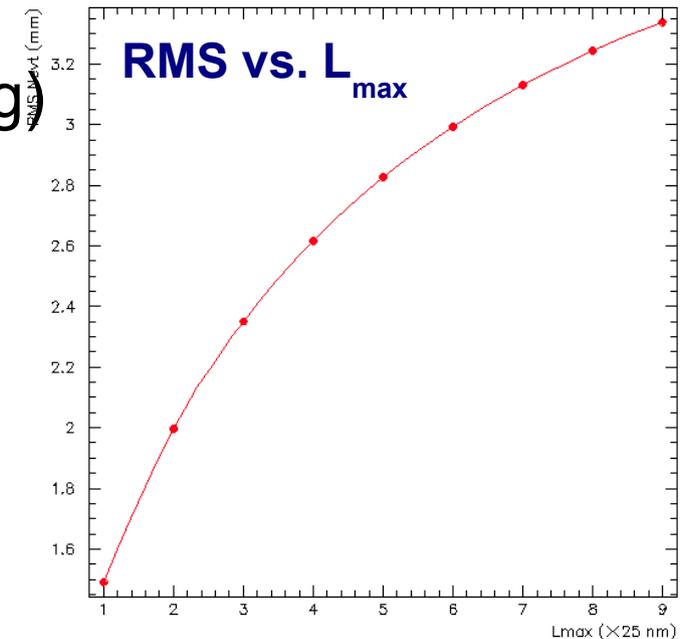


#events / channel

$0.4 < T_{\text{det}} < 0.9 \text{ MeV}$

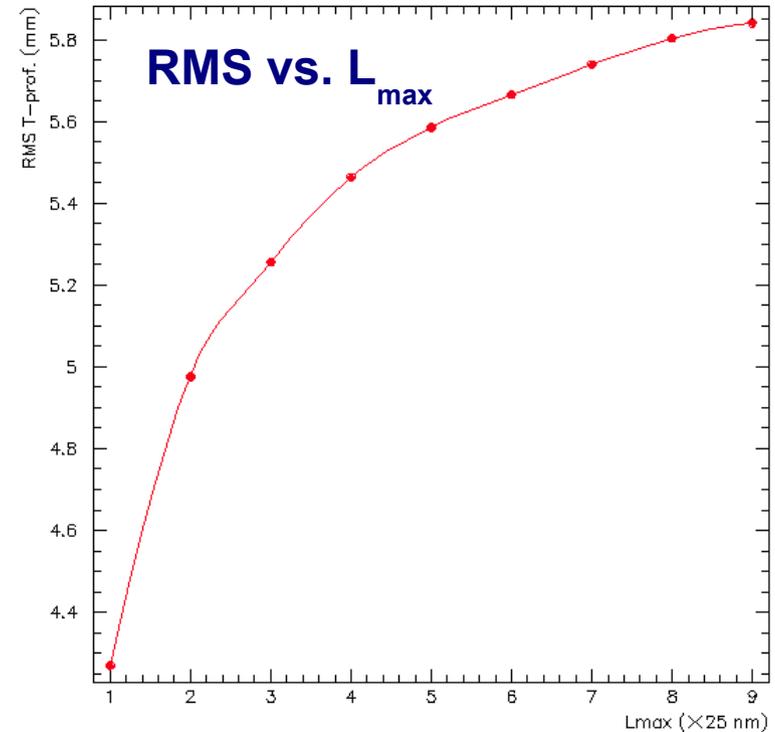
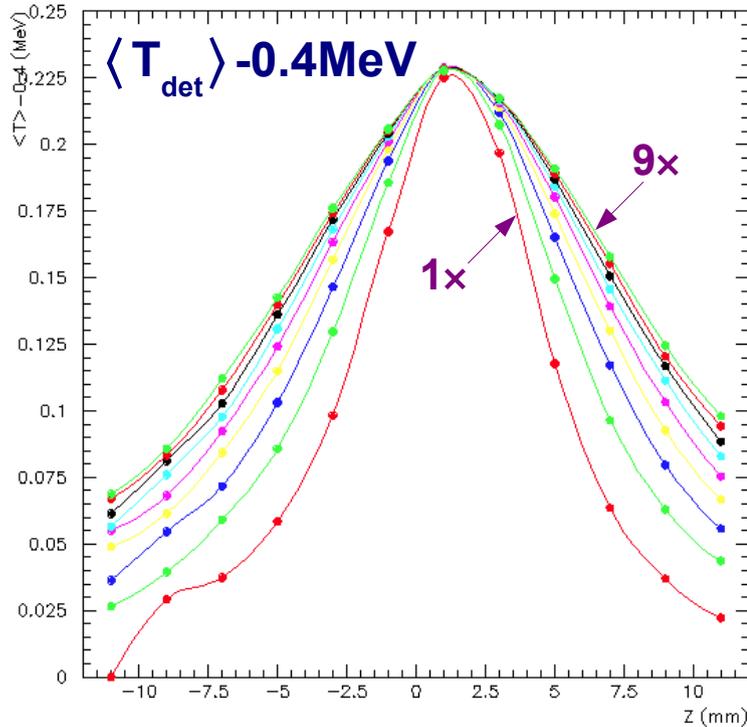


- Peak position $\propto Z_{\text{target}}$ (longitudinal swaying)
- Increasing $L_{\text{max}} = (1 \rightarrow 9) \times 25 \text{ nm}$
- RMS of distribution increases strongly with L_{max} :



$\langle T_{\text{det}} \rangle$ / channel

$0.4 < T_{\text{det}} < 0.9$ MeV



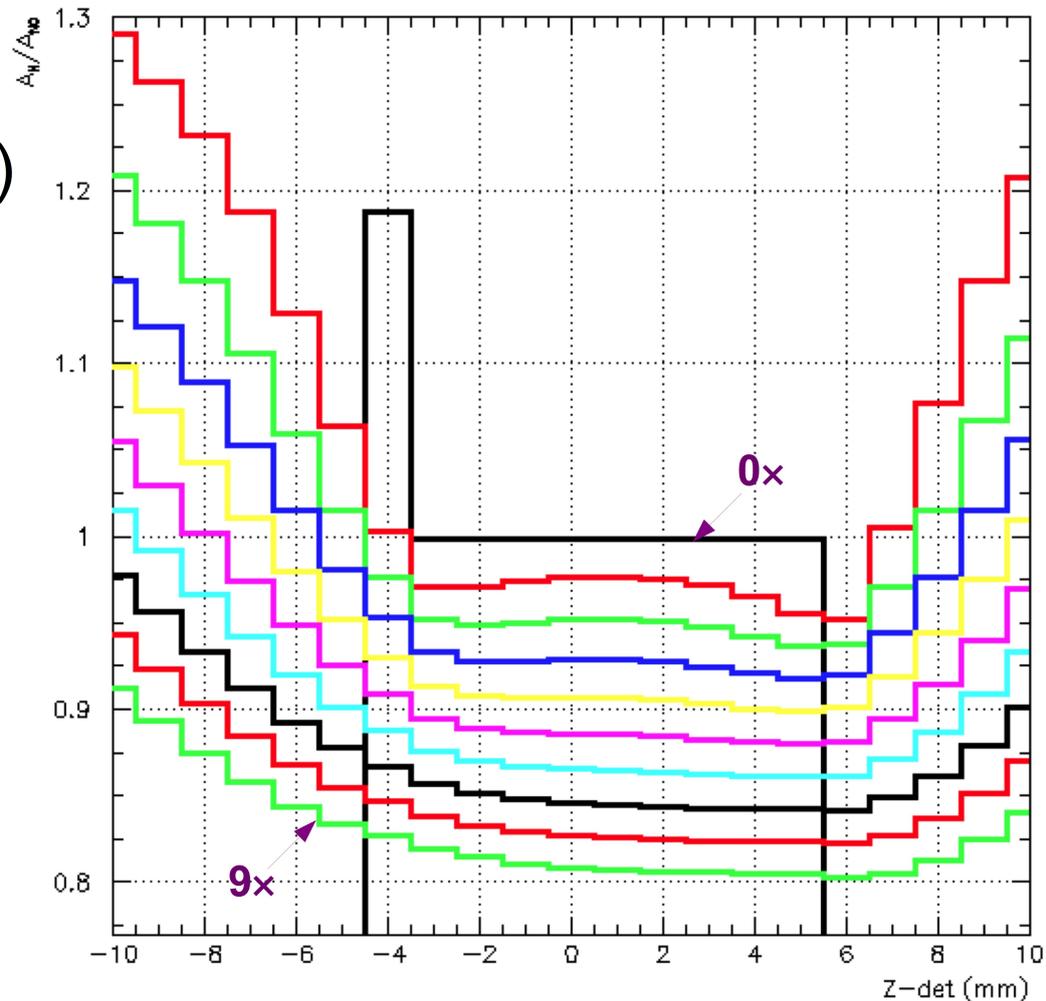
- Increasing $L_{\text{max}} = (1 \rightarrow 9) \times 25$ nm
- RMS of distribution increases with L_{max}

Peak, RMS $\Rightarrow A_N$

- From peak: $Z_{\text{target}} = -Z_{\text{det}}$ (target position w.r.t. det.)
- From RMS: L_{max} (thickness)
- From L_{max} , Z_{target} : effective A_N
- Here e.g. for normal (azim. seg.) BNL det., A_N/A_{N0} (A_{N0} no material) as function of:

- Z_{det}
- $L_{\text{max}} = (0 \rightarrow 9) \times 25 \text{ nm}$

- **With data could parameterize:**
e.g. $A_N(Z_{\text{det}}, L_{\text{max}}) \sim A_N(Z_{\text{det}}, \text{RMS})$



Proposal

- Rotate one pair of BNL detectors: aim. seg. → long. seg.
a pair still allows L/R symmetry, 'square-root-formula'...
- Mechanically:
 - holes in flanges line up OK
 - preamp boxes fit OK in 45° det.;
 - 90°det. may hit horizontal step. motor shaft
 - are rotated detectors still centered in port?
- **This would provide some new and potentially useful info we don't presently have**

Extras

Other Run 12 issues

Questions from Steve Jao (and what I think):

- Can signal cables MUX→tunnel rack be removed? **Yes**
- What are extra cables hut→tunnel for?
We had 8 control signals hut→tunnel rack, don't need. Use for scint.?
- Jim/Seth informed of MUX switch etc.? **???**
- Definite plan for det. type/locations?
So far: BNL/Ham. same places, replace B2U det. 4. Rotate pair?
- Any other mods, changes? **???**
- Detector pre-testing? **???**

We should get a work list, time frame to Tony/Steve

t0 scintillator needs, for 8 channels:

- We will order some Hamamatsu PMT assembly H6524
- Scint./mechanical assembly? Like old one, Grigor?
- Need signal, HV cables. Signal from above noted spares? HV Tony?
- Need HV supply, adequate current. Where from?