

More thoughts on endplate geometry

G. Finocchiaro

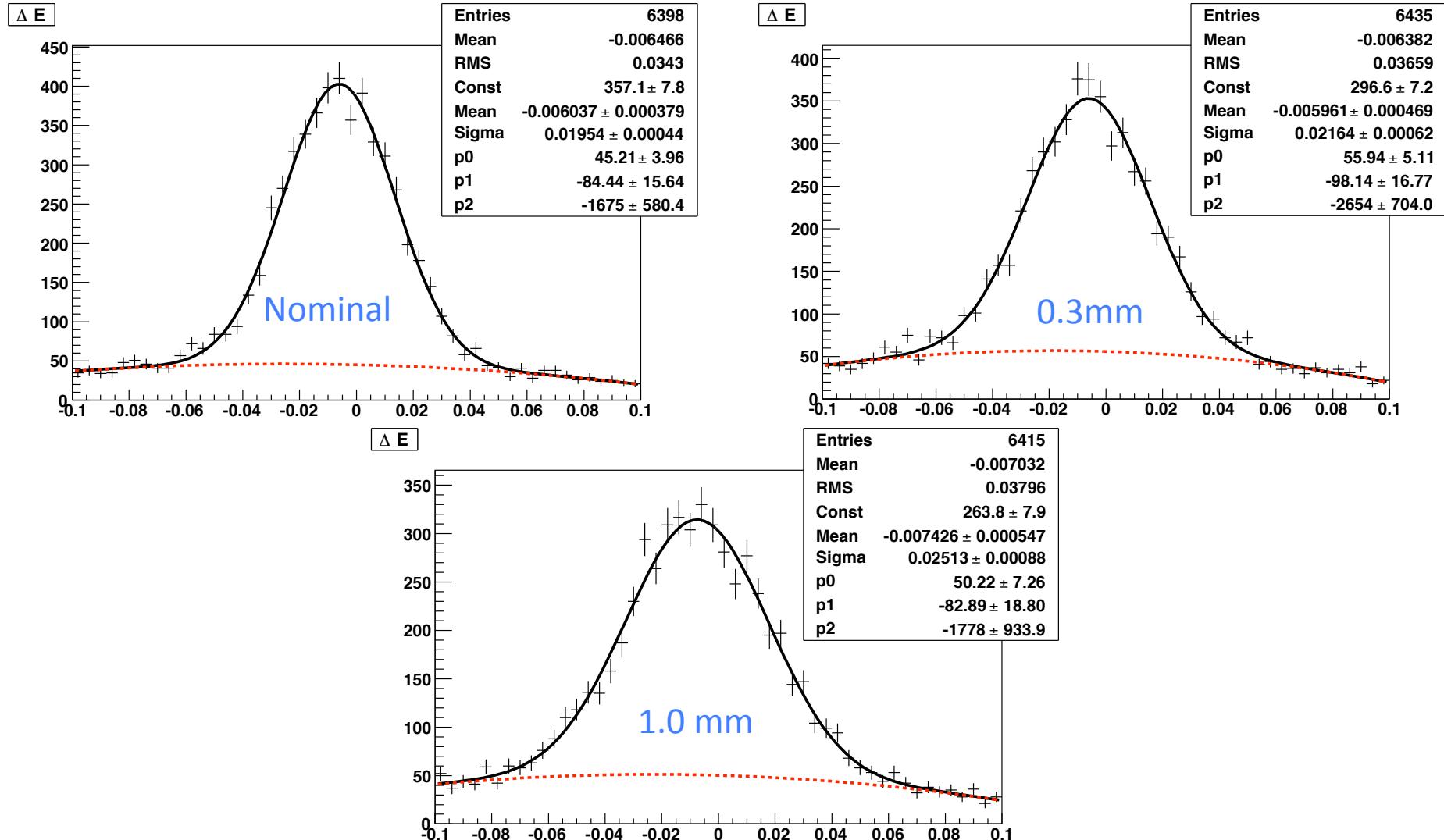
INFN-LNF

Effect of having two chambers in FastSim

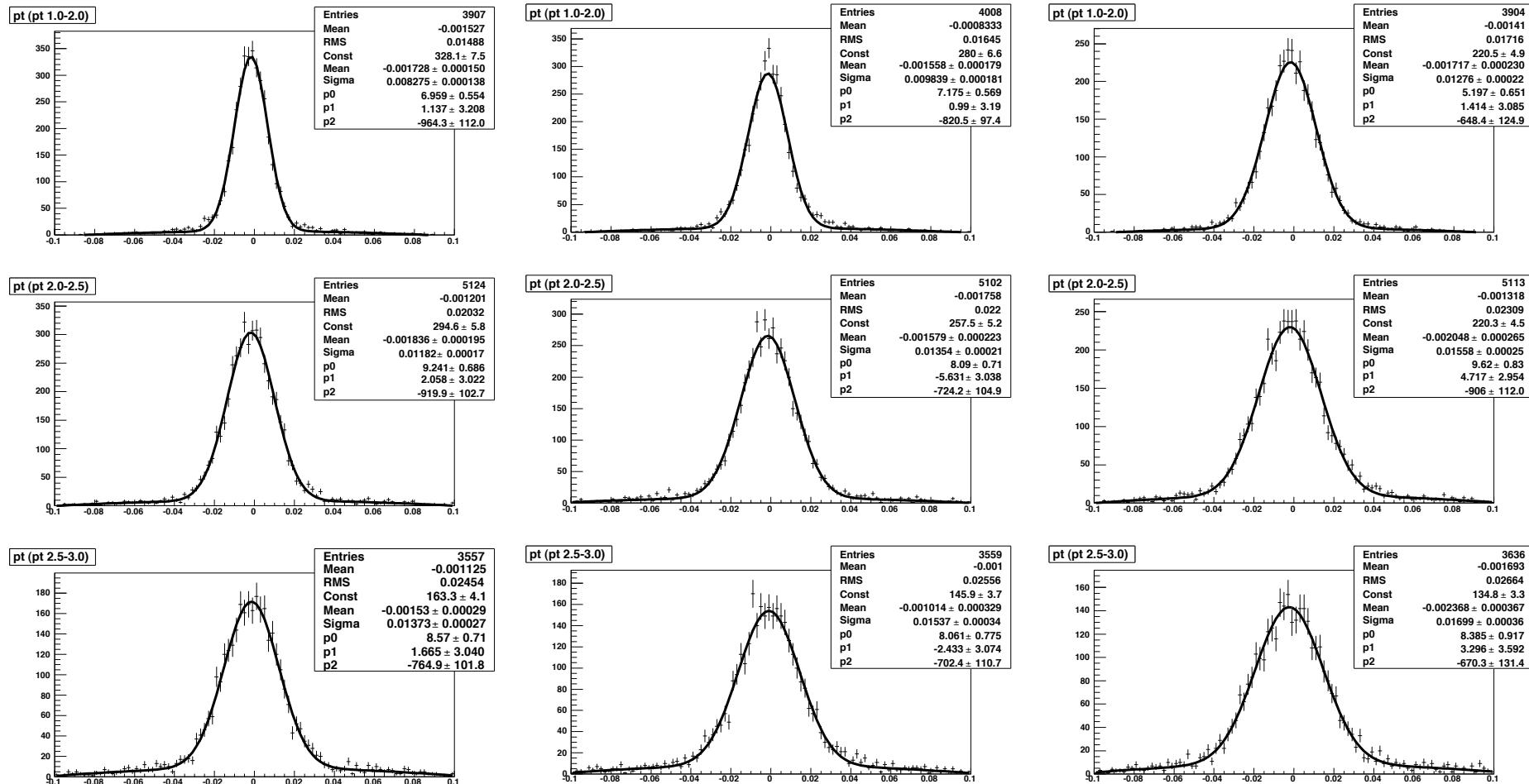
The possibility to build two separate chambers has been suggested to address the problem of inner layers occupancy.

- Use FastSim V0.0.3
 - Not the latest, but OK for a relative comparison
- Verify the effect of inserting a CF wall of 0.3 or 1.0 mm
- (Arbitrarily) choose a radius of 41.5 cm: assume the two inner and outer chambers separated after the first three AUV super-layers of the *BABAR* layout
- Benchmark channel: $B \rightarrow \pi\pi$
 - Look at ΔE and p_T resolution

Effect of having two chambers: ΔE



Effect of having two chambers: p_T



Nominal

17 June 2009

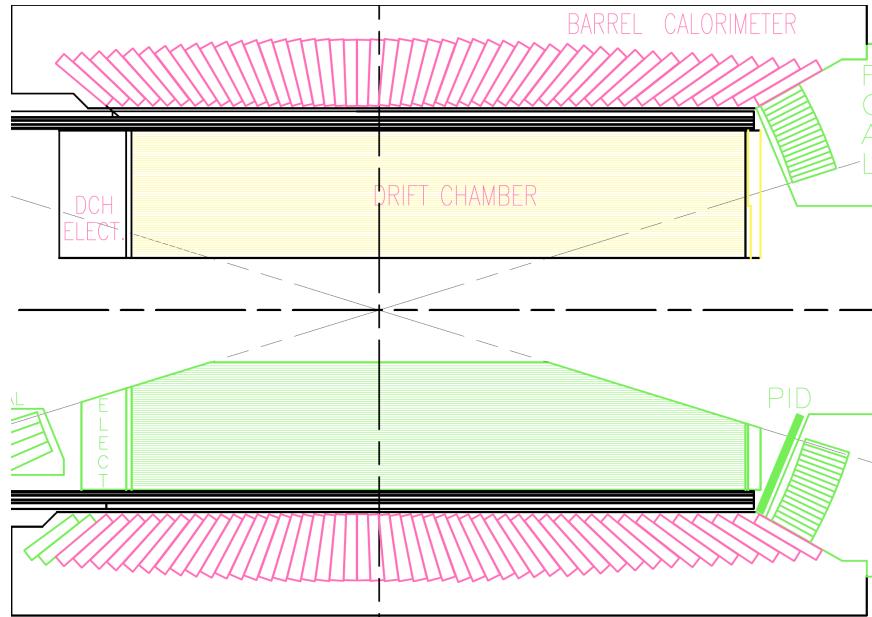
0.3mm
G. Finocchiaro

1.0 mm

4

An alternative solution

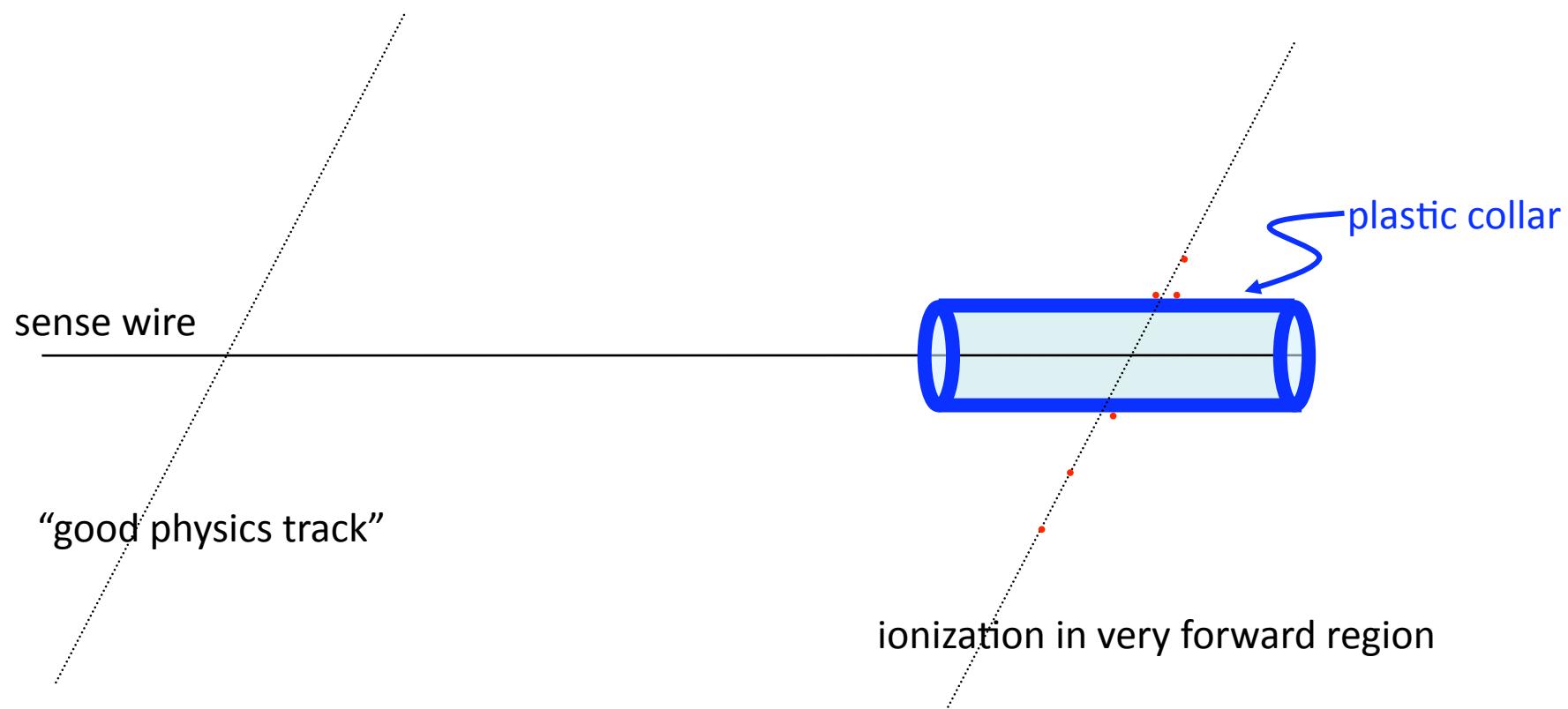
Very high background rates are expected in the forward region



- ➡ high occupancy in innermost cell layers, possibly tamed with:
 - ✓ tapered endplates (discussed in Chris' talk)
 - ✓ screening the sense wire

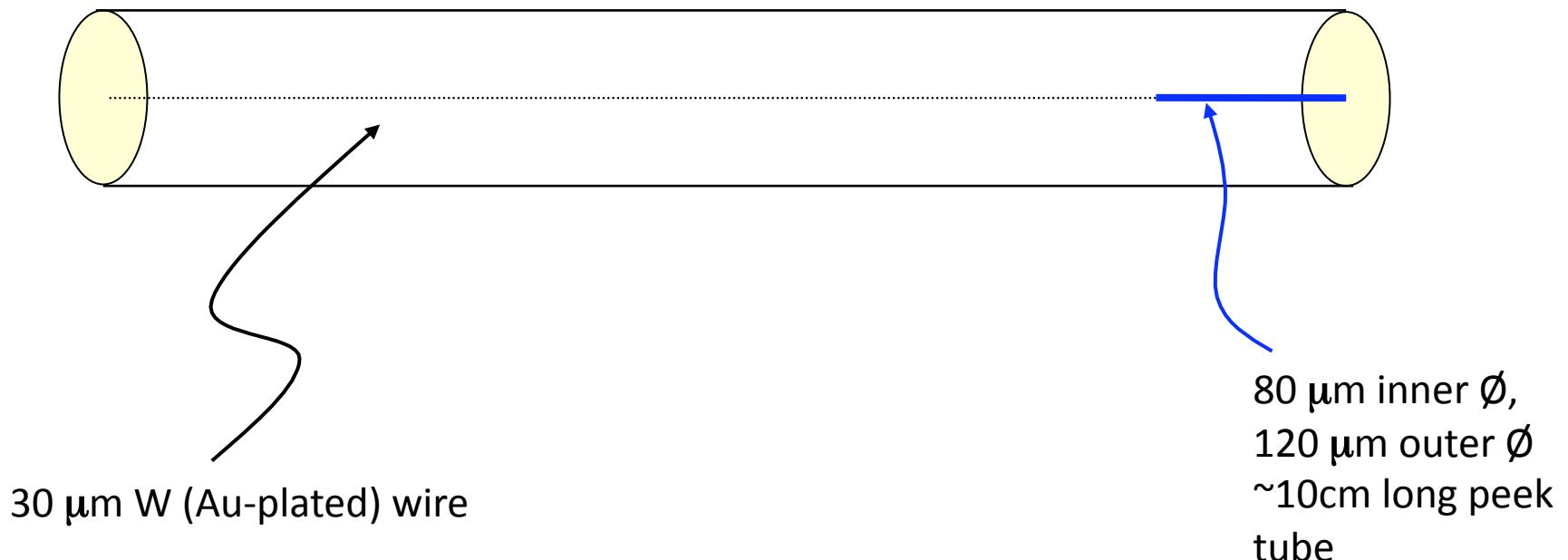
Mechanical Quenching

- Preventing electron multiplication in selected regions along the sense wire

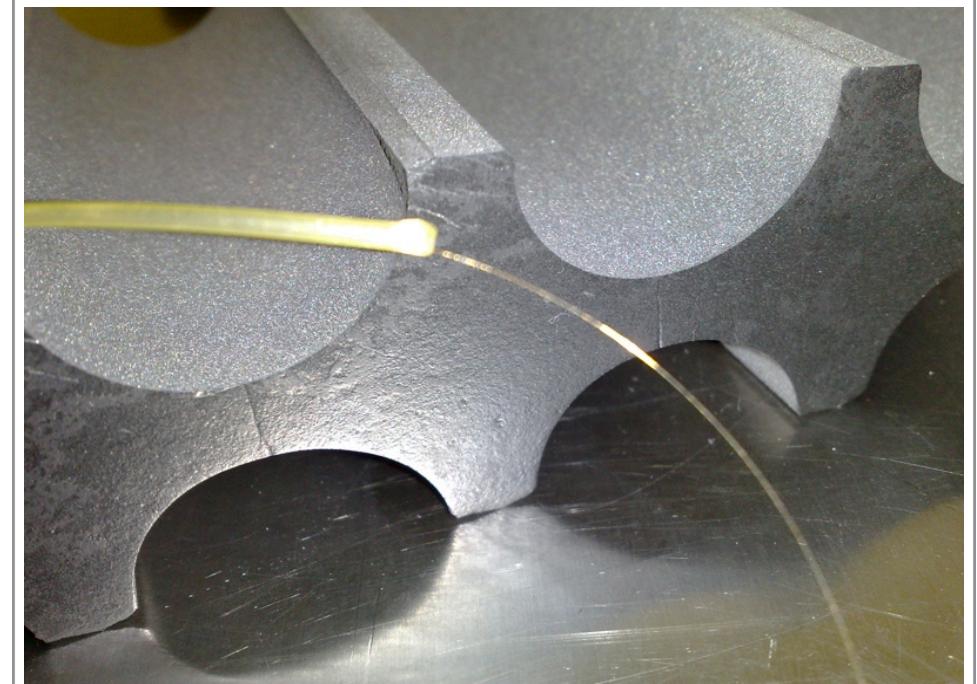


Mechanical Quenching

- Testing the idea: drift tubes, with part of the sense wire ‘screened’.



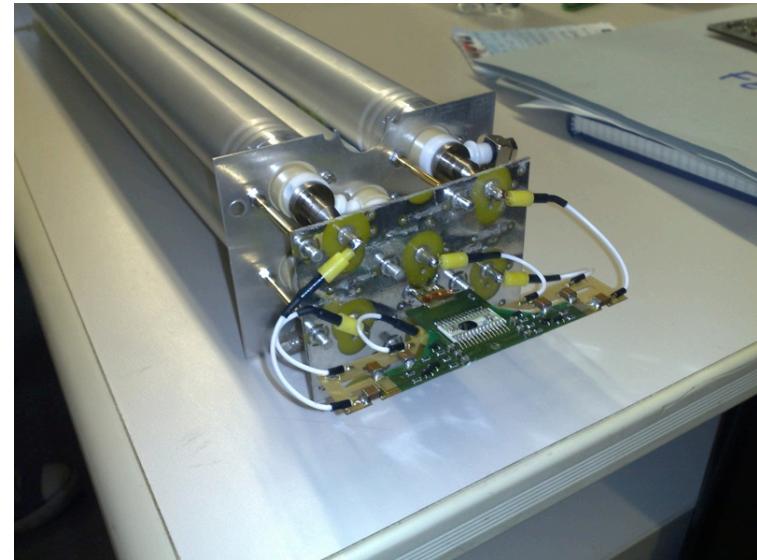
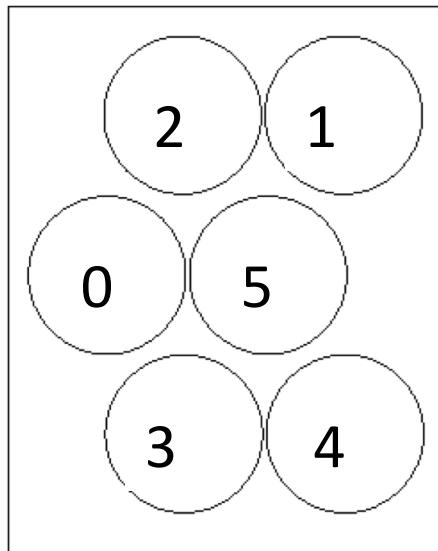
Mechanical Quenching



- Shield final part of sense wire with a plastic tube
- Tried two different plastics

Mechanical Quenching

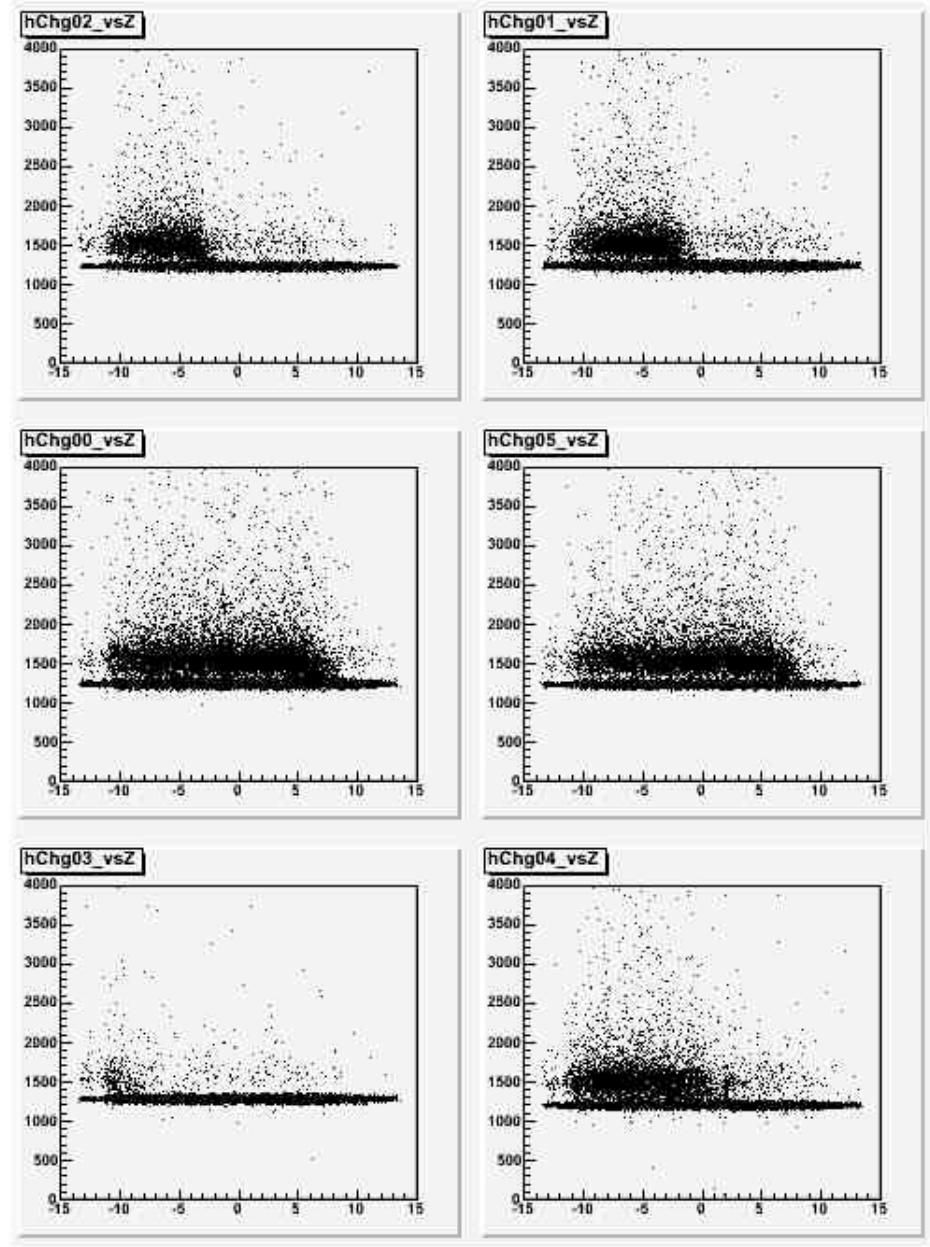
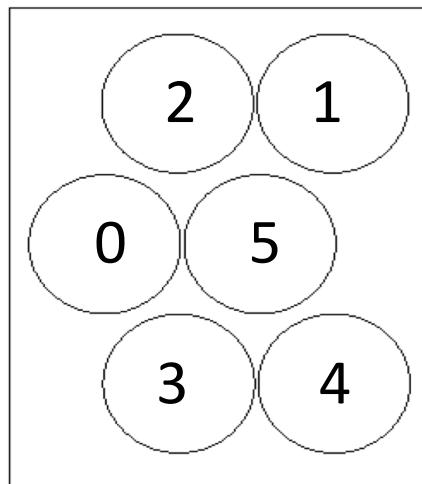
- 0 = Reference n.1
- 1 = PEEK #1 ~11cm
- 2 = PEEK #2 12.5 cm
- 3 = plastic #2 ~16 cm
- 4 = plastic #1 10.5cm
- 5 = Reference n. 2



Mechanical Quenching

Collected charge vs. z
along the wire

- 0 = Reference n.1
- 1 = PEEK #1 ~11cm
- 2 = PEEK #2 12.5 cm
- 3 = plastic #2 16.5 cm
- 4 = plastic #1 10.5cm
- 5 = Reference n. 2



Summary and outlook

- The solution with two separate chambers has significant impact on the ΔE , p_T performances of the detector in $B \rightarrow \pi\pi$
- Preliminary results on mechanical quenching by wire screening are encouraging
 - Next steps:
 - measure time-to-distance relation with MIPs
 - evaluate efficiency and resolution as a function of z , particularly in the transition region
 - Need also to consider carefully:
 - Long-term behavior/aging
 - Stringing issues