SiD FCAL

William Morse - BNL

Efforts

- Bad news - BNL got no ILC detector R&D engineering $
- Good news - “ “ “ “ “ “
- Gunther, Kurt, Bill et al. have been great!
- Colorado has been doing a great job on BeamCal physics simulations!
- Bad news - BNL got no ILC rad-hard Si BeamCal sensor R&D $s for Zheng Li (Instrumentation).
- We will put in a generic R&D proposal as soon as Gerry calls for proposals.
- I continue to be interested and involved, but travel $s are an issue.

BeamCal Interface Issues

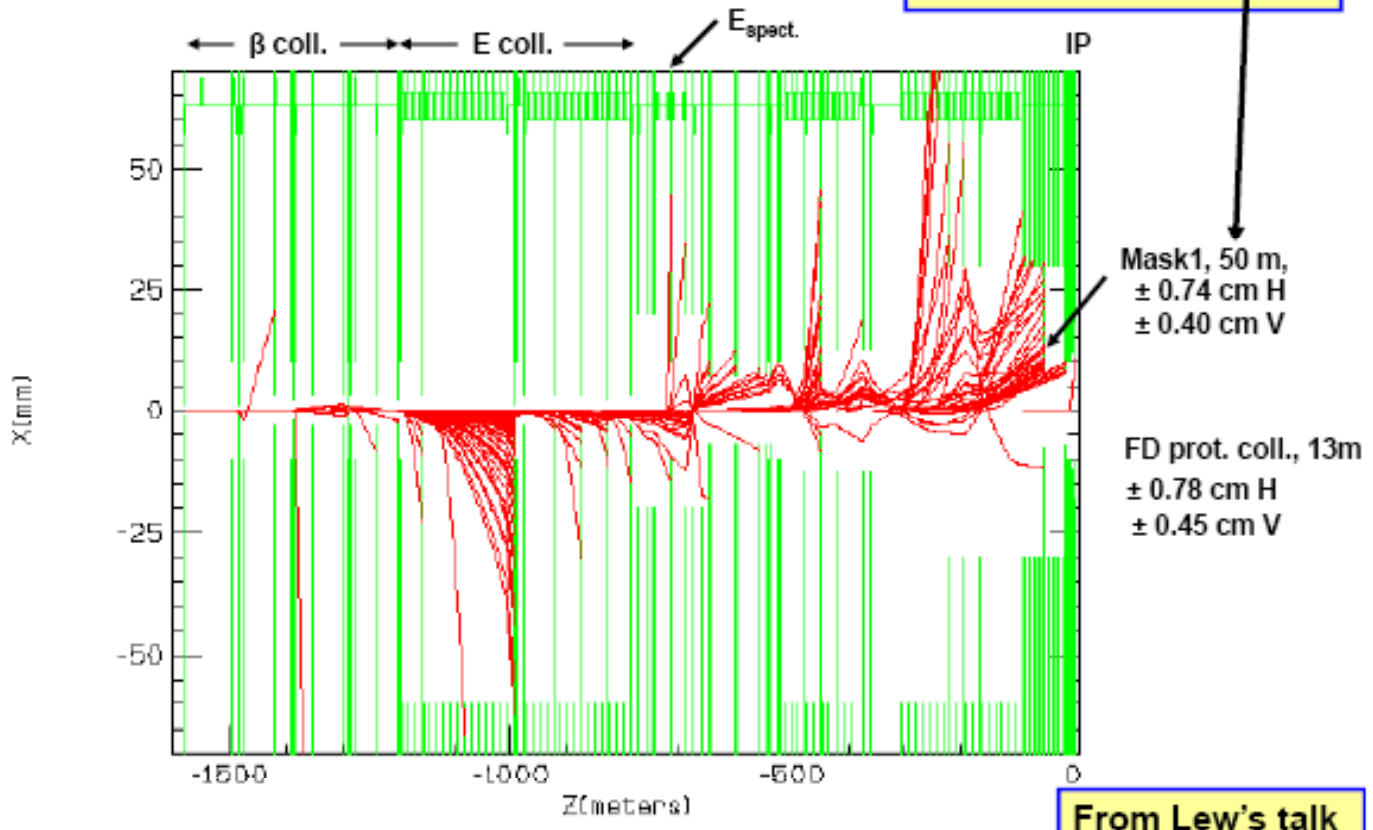
- Question from yesterday's Forward Region engineering talk:
- "Do we need lumped ion pumps close to the BeamCal?"
- See my White Paper October 10, 2007 for more complete discussion.
- Do we need two beam pipes going through BeamCal, or can we use only one?

IRENG07 at SLAC

Need 1 nT pressure with perhaps 100 nT at the IP

as brem. trajectories in the BI

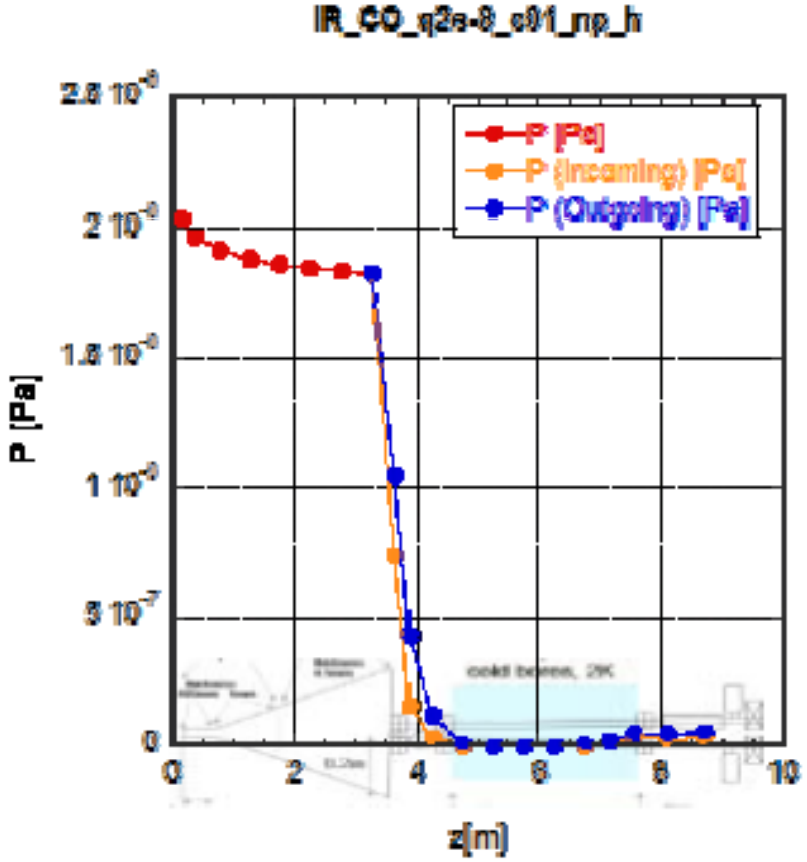
Mask seems very close to the IP



From Lew's talk

Vacuum Pressure

- Pressure distribution after 100 hours evacuation
- Calculated by a Monte Carlo code



– Q = 2×10^{-8} Pa m^3 /s /m^2 for CO

– P (z < L*) > 1×10^{-6} Pa!

Some pumping are required at z < L* !

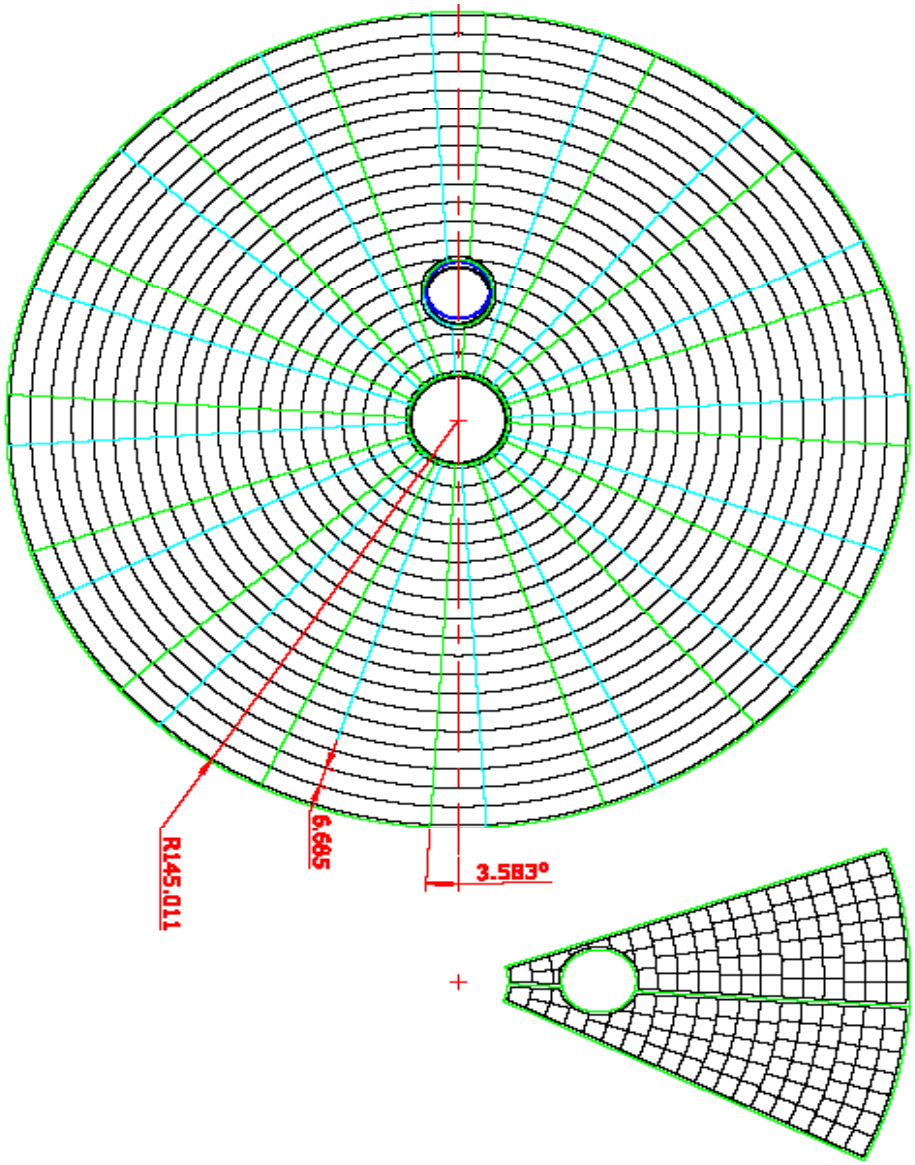
Vacuum Pressure

- 1 Bar = 760 Torr = 101300 Pascal
- 2×10^{-6} Pascal = 15nTorr.
- Requirement is <1nTorr in beamline.
- <100nTorr in the detector region.
- 2×10^{-6} Pascal in detector region is perfectly fine!

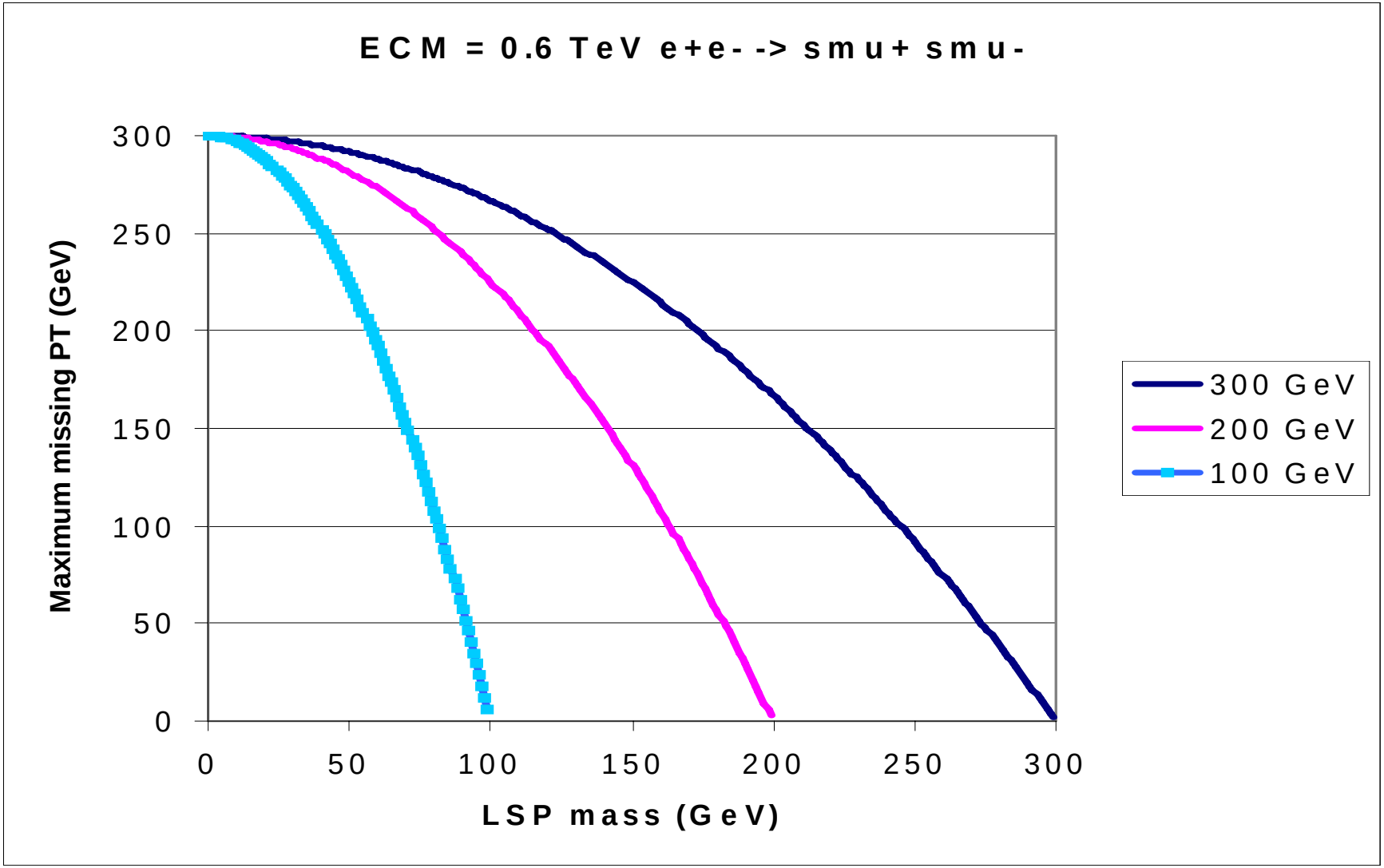
Beampipes through BeamCal

- The above calculation was for two beampipes going through the BeamCal.
- What are the physics constraints that prevent us from going to one larger beampipe?
- Cheaper, better conductance, etc.

Bill Cooper’s BeamCal Sensor Slide



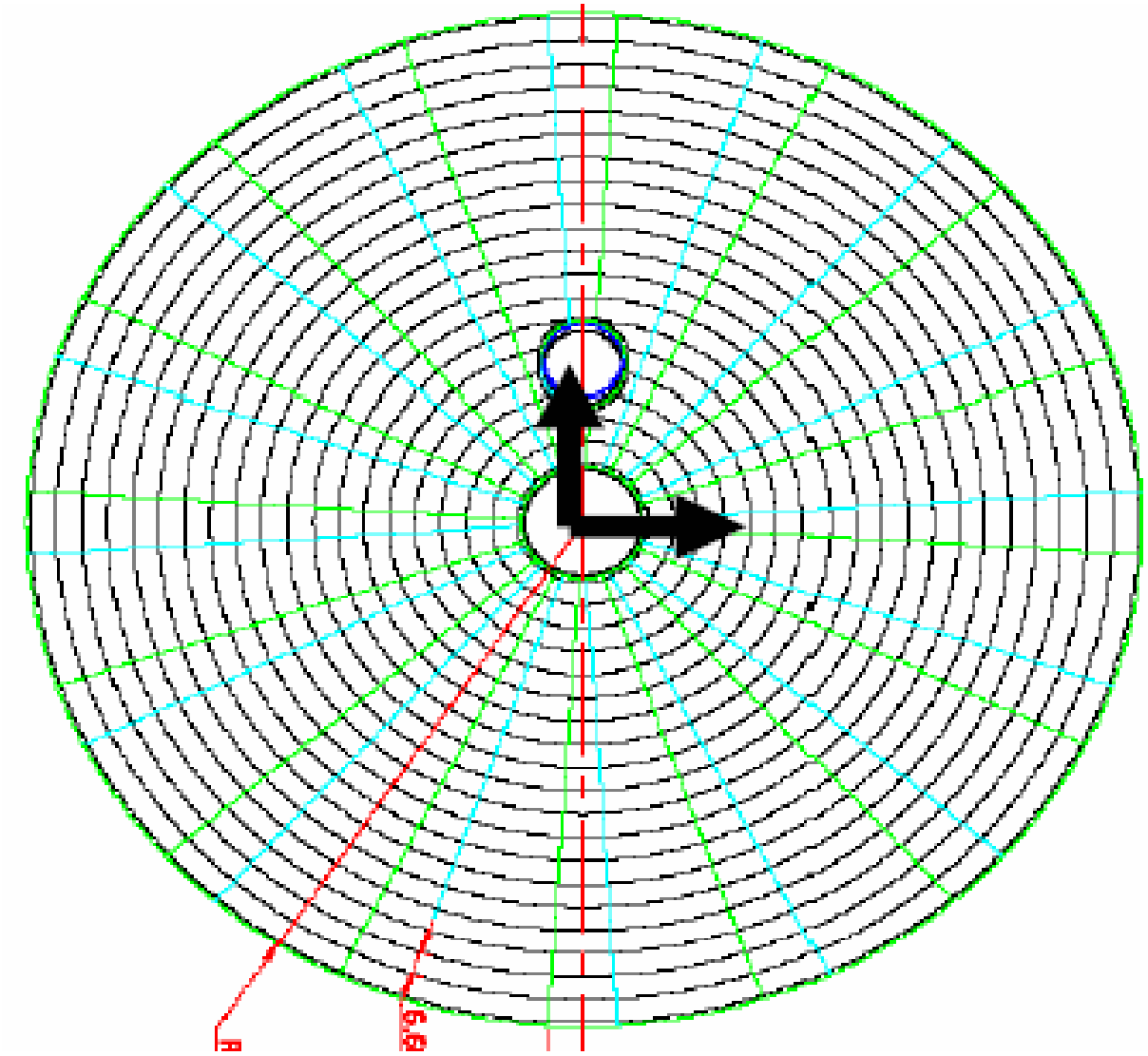
$e^+e^- \rightarrow smu^+ smu^- \rightarrow \mu\mu\chi\chi \rightarrow \mu\mu$ $P_T$miss



Background – see talks by Uriel

- $e^+e^- \rightarrow \mu\mu ee$
- No missing P_T
- Cross section 10^5 greater than SUSY
- If ee go into outgoing beam holes,
- Missing $P_T < 2GeV$.
- What if an outgoing electron goes into the incoming beamhole?
- Missing $P_T \approx 0.014 \times 250GeV \approx 3.5GeV$

Missing P_T = 3.5 GeV/c



Conclusions

- For the physics case, we are very happy with Bill Cooper's BeamCal sensor layout two beam holes.
- One beam hole may be OK for the physics.
- Colorado will study this.
- Cheaper, even better vacuum in the detector region, etc.