

Discussion plan

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Common beliefs

- TPC offers good intrinsic **spatial resolution, 2-track resolution, and dE/dx resolution.**
- Tracking in gas is a relatively efficient way to extract spatial information from traversing particles due to a small contribution from multiple Coulomb scattering and hence good performance at **low momentum.**
- Questions remain as to the effect of the relatively weak TPC track-separation resolution on the tracking efficiency within dense **jets**; however, this is hopefully should not be a significant issue once sophisticated **reconstruction algorithms** are developed. **But needs to be proved.**
- **I am not touching today evergreen questions about bias corrections, distortions, ions back flow, alignment etc...**

Carleton group plans

- LCTPC optimization as an integral part of ILD.
 - All related issues/topics presented in the previous page plus anything equally important.

The aim is to prove/solidify the usefulness and advantages to have LCTPC in ILD layout.
- ILD optimization for more general physics cases
 - The concrete processes and physics cases we hopefully can converge upon until the end of this year:
 - We could join one/few topics already in the Jenny's list. and/or
 - We may come up with some physics cases not covered yet.

Interested in:

- justification of continuous tracking.
- particle algorithm (beyond of what exists in software already) - like PFA etc.
- parameterization of r-phi and z for two hit separation (in 3D).
- digitization processor (puts charge on the pads).
- involvement in “physics analysis” and “reconstruction and analysis tools” (to follow classification in Jenny’s list.)
- We would be happy to hear your thoughts on how to move forward on these topics!

Human resources

- Carleton – RM + student (~May 2015)
- Saclay - Serguei(?) + student, spring 2015?
- Bonn - Jochen(?) + student, spring 2015?
- KEK – Keisuke, Junping, Tomohisa, who else?
- Who else is involved or planning to be involved at this moment in TPC ILD specific optimization work from other institutions?

What to discuss today?

- It is good idea to know what is the status of LCTPC optimization at present:

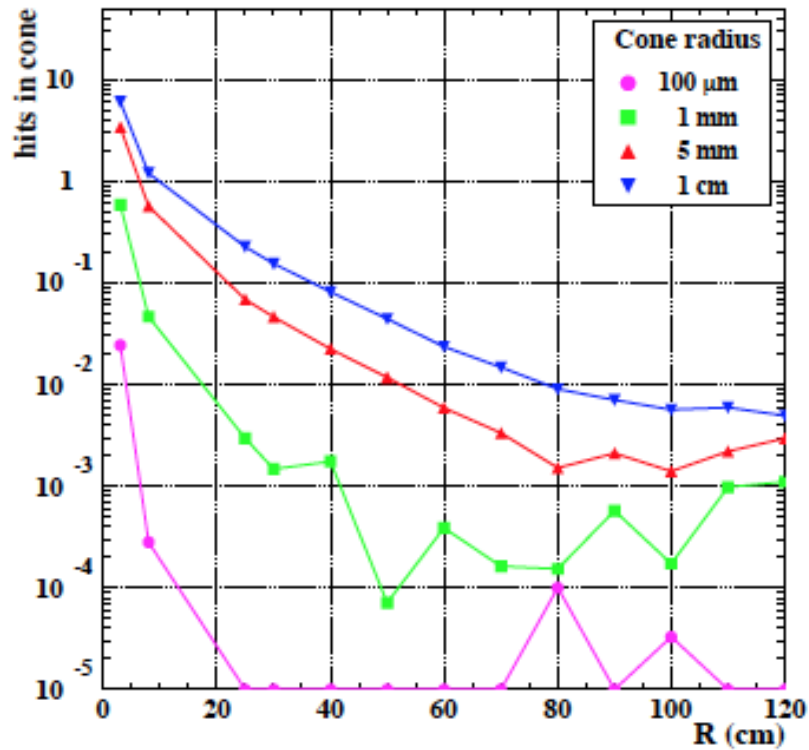
Junping's brief review will follow.

During my stay at DESY, I will concentrate on learning how to start and what tools are available.

- Need to have regular meetings on this activity, exchange ideas/tools, coordinate our efforts to focus toward the better understanding of our detector and its capabilities.
- Again, please share your thoughts on how to move forward!

Back up

Two particle resolution (example)



Old GEANT3 simulation of $b\bar{b}$ events in TPC.

Average number of additional hits within a cone of a given radius, as a function of radius of the tracking layer. $\sqrt{s}=500\text{GeV}$, $B=4\text{T}$