

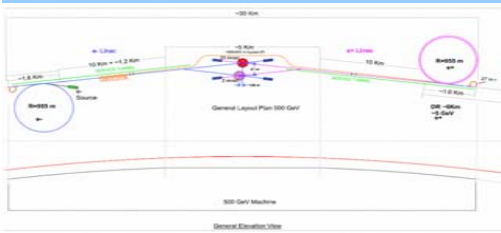
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The International Linear Collider Project

*Keith Drake, Tera Dunn, Joshua Elliot, Jack Gill,
Gleb Oleinik, Uriel Nauenberg, Joseph Proulx,
Elliot Smith, Jiaxin Yu, Jonathan Varkovitzky,
Francis Yi*



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The FCAL Collaboration

SLAC

Yale, BNL

Colorado

Fyzikální ústav Akademie věd ČR

ИИФ ВФБЭ

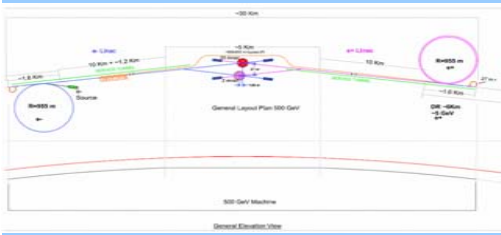
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The Very Forward Calorimetry Collaboration

see: PRC R&D 01/02 (2002)



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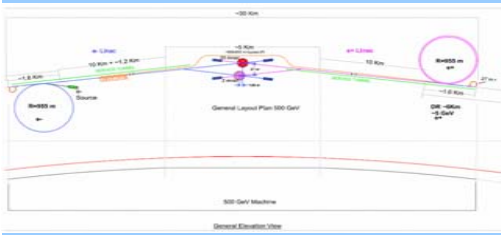


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TOPICS

- *BeamCal Studies*
- *Calorimeter Description*
- *Charged track hit removals*
- *Association of Showers. Pattern Recognition.*
- *Separation of π^0 s from single photons*

- *Hardware Studies*



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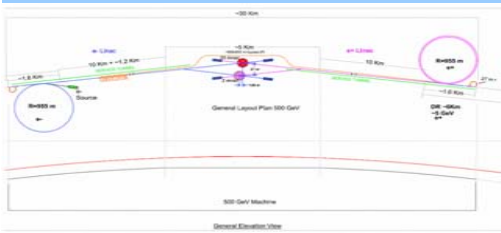


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SUPERSYMMETRY STUDIES

- ☀ Began working in 1994.*
- ☀ Began working with undergraduates in 1996. First report by students in 1998. Presently we work with 5 to 8 students per year. Most stay with us through 3 years. Involved about 50 students to date.*
- ☀ Reports presented on the web*

<http://hep-www.colorado.edu/SUSY>

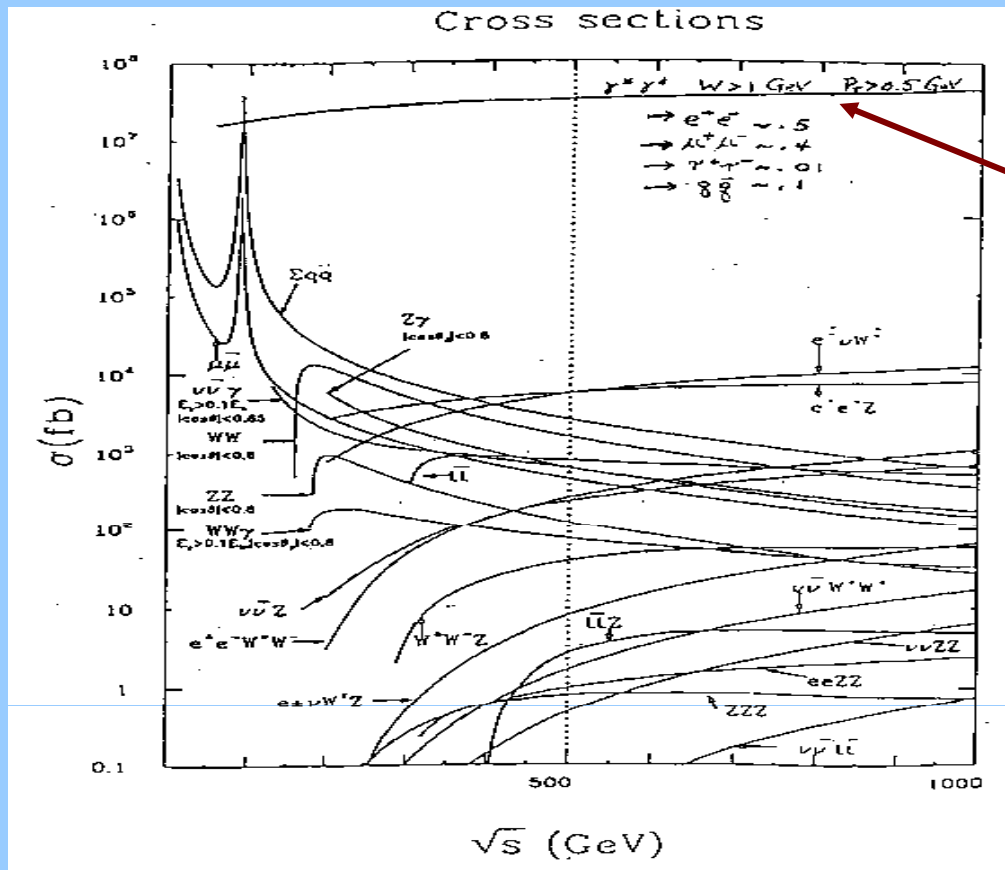


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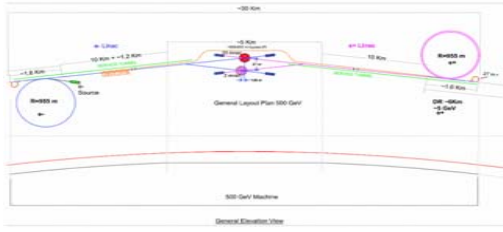
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Beam Calorimeter Studies



Two photon process cross section about 10^5 larger than SUSY cross section. Serious source of background for SUSY if not tagged.

Pointed out by our group around 1998

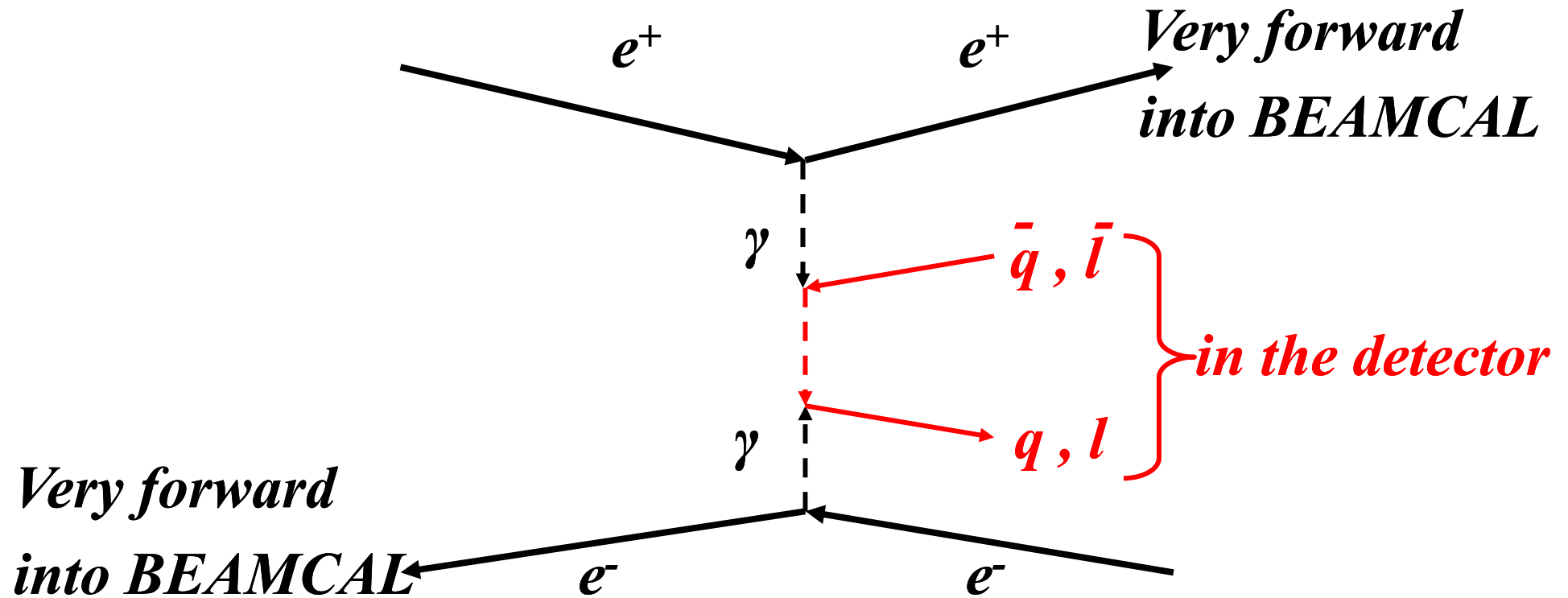


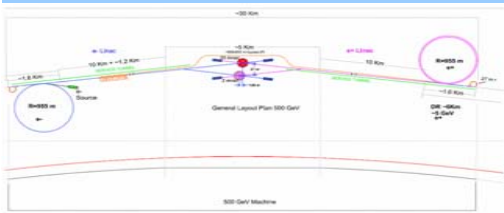
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2 Photon Process

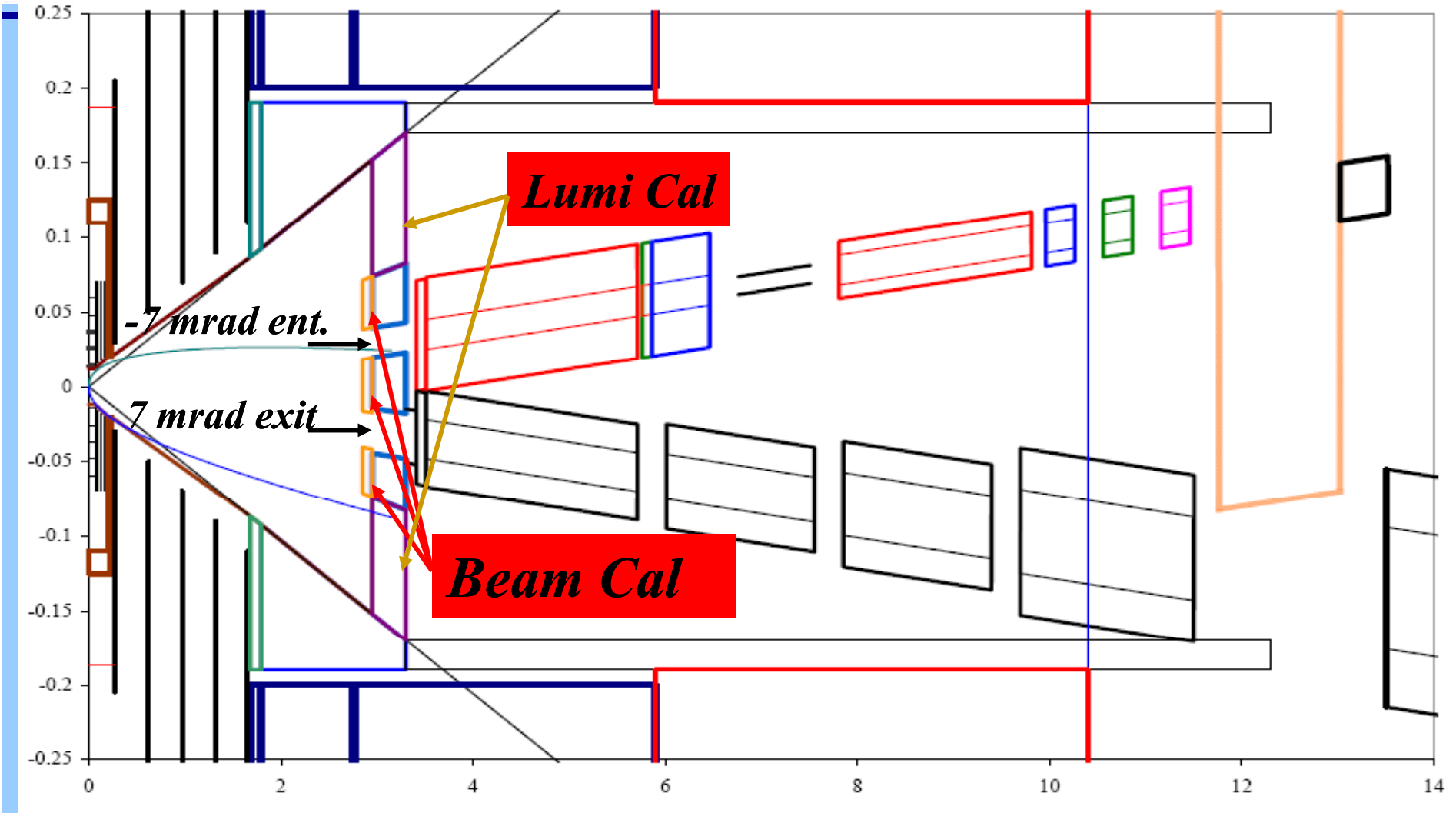


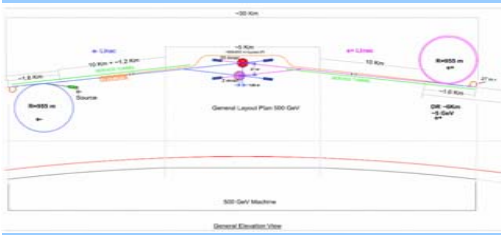


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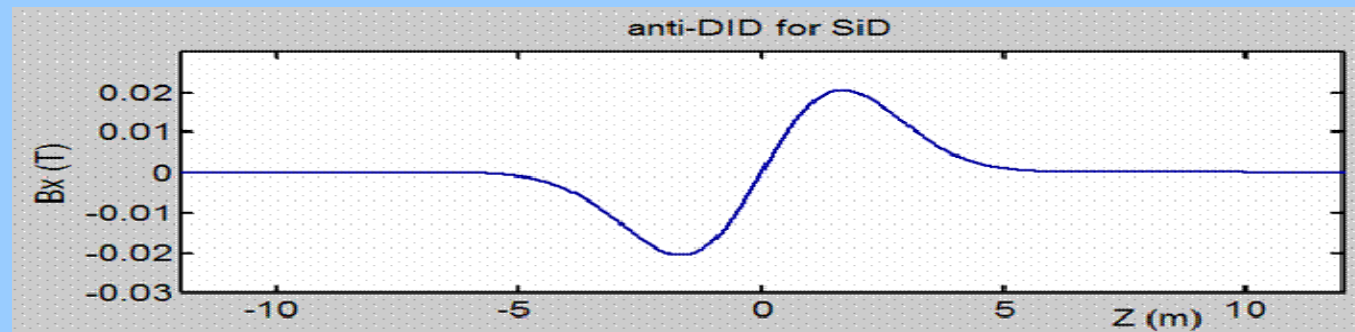


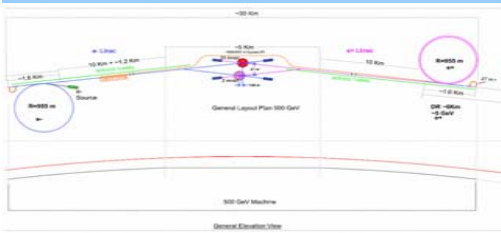
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Solenoid field keeps the low energy charged particle in the forward direction. Beam hole is at 7 mrad. Need to add an x field component to move low energy charged particles in the 7 mrad direction. Anti-DiD dipole field proposed by Andrei Seryi.



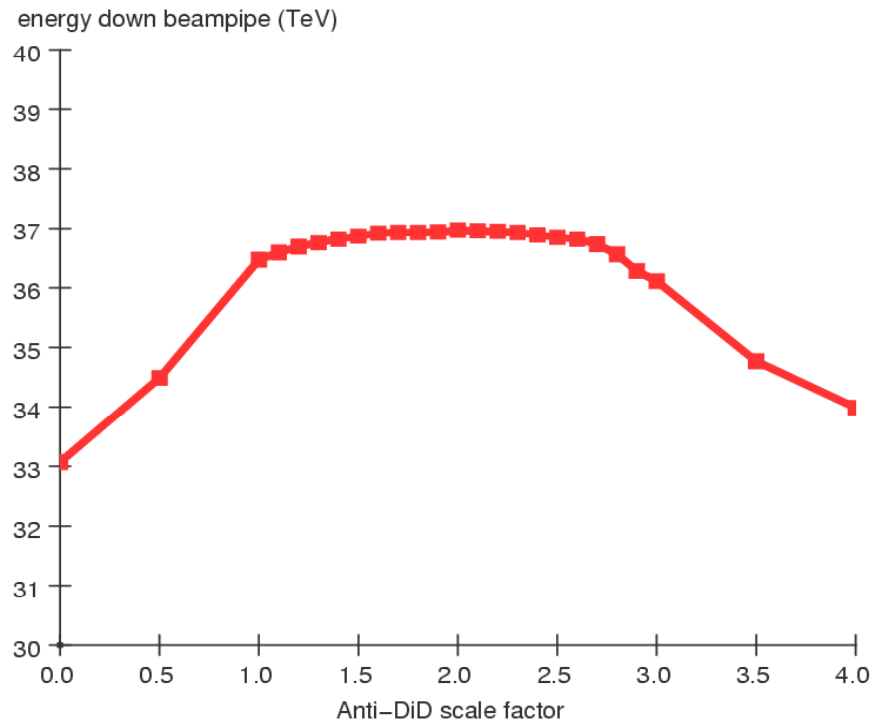


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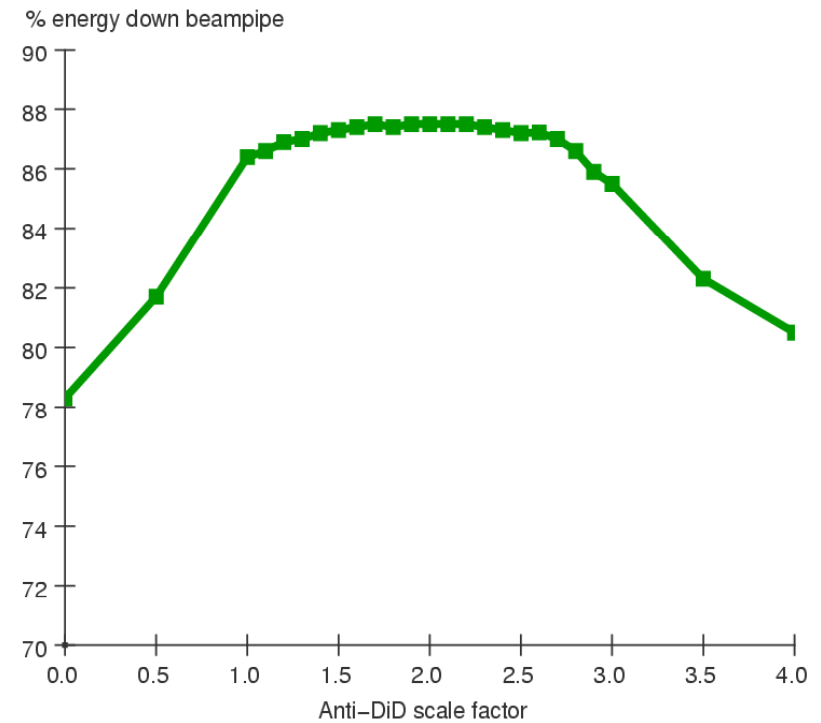


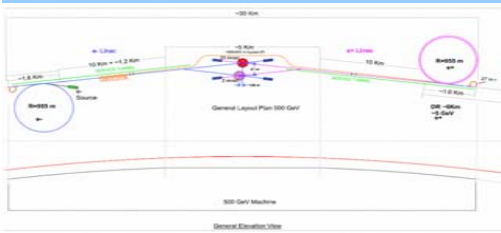
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Anti-DiD optimization for detector @ z=295cm (TeV)



Anti-DiD optimization for detector @ z=295cm (%)

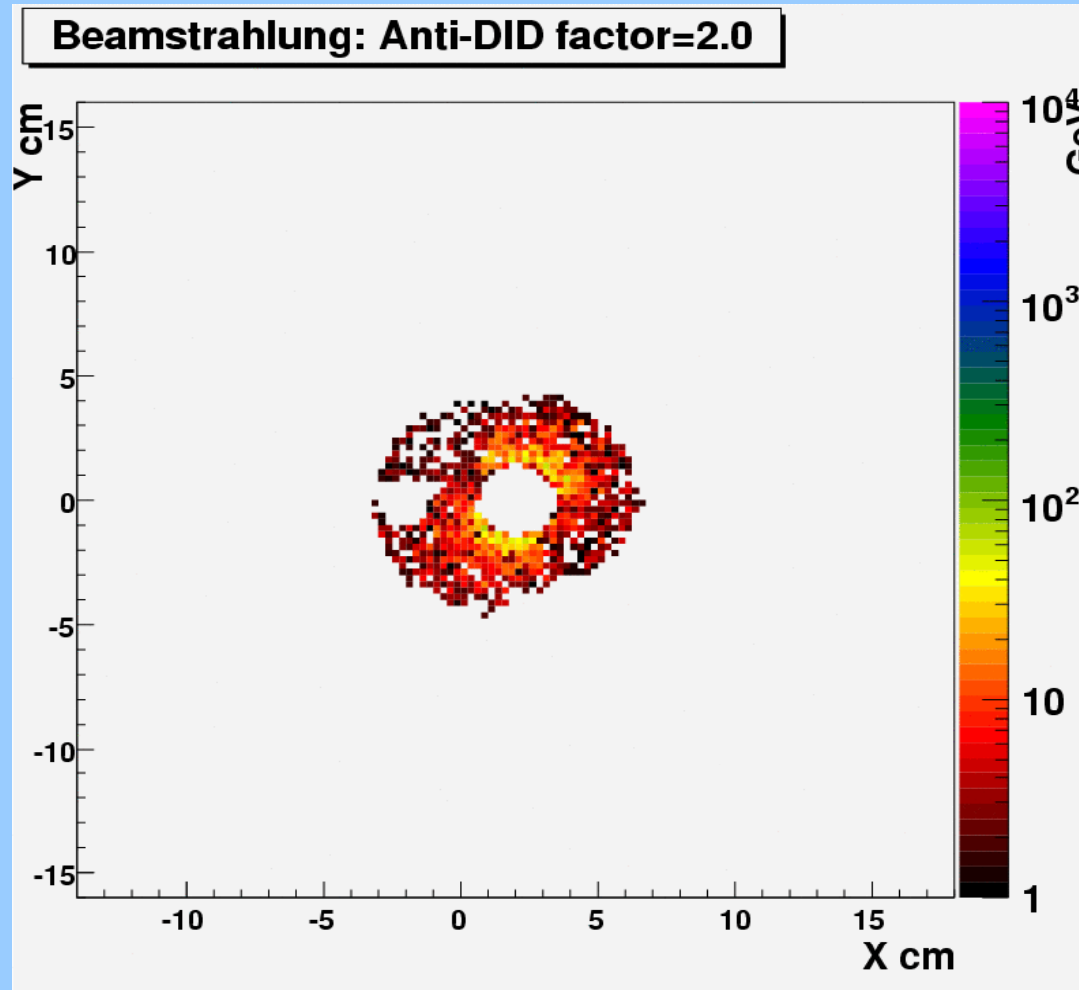




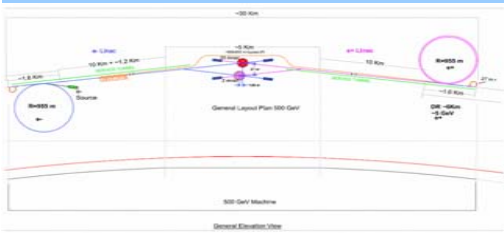
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*Beamstrahlung e^+e^- pairs.
Energy deposited in
 $0.25 \times 0.25 \text{ cm}^2$ cells.*

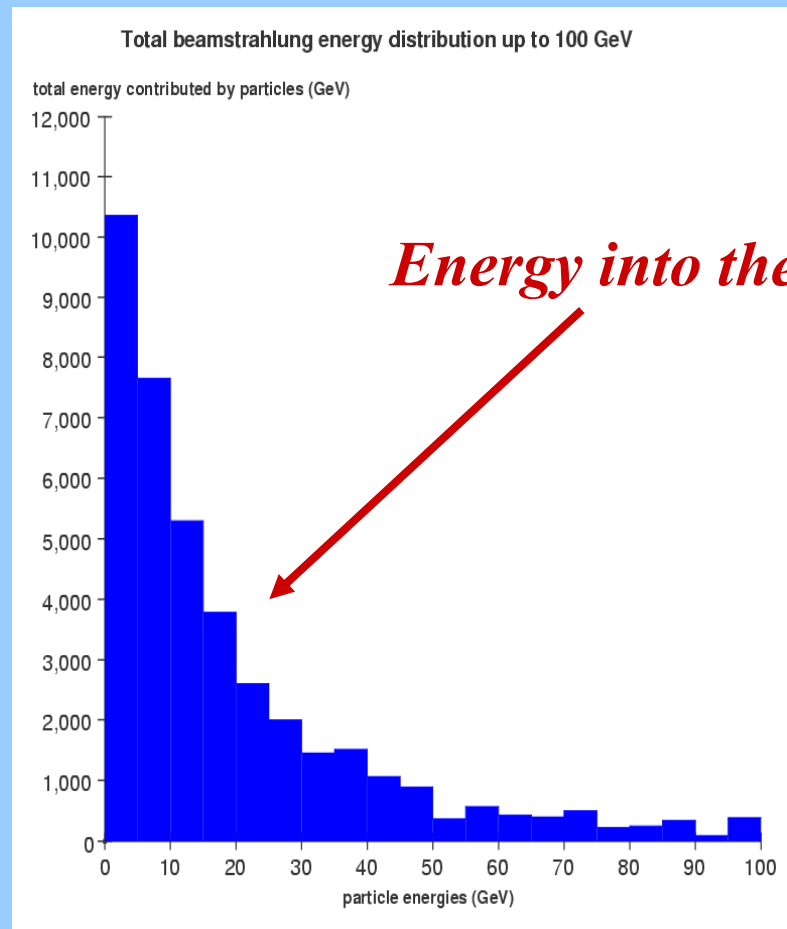


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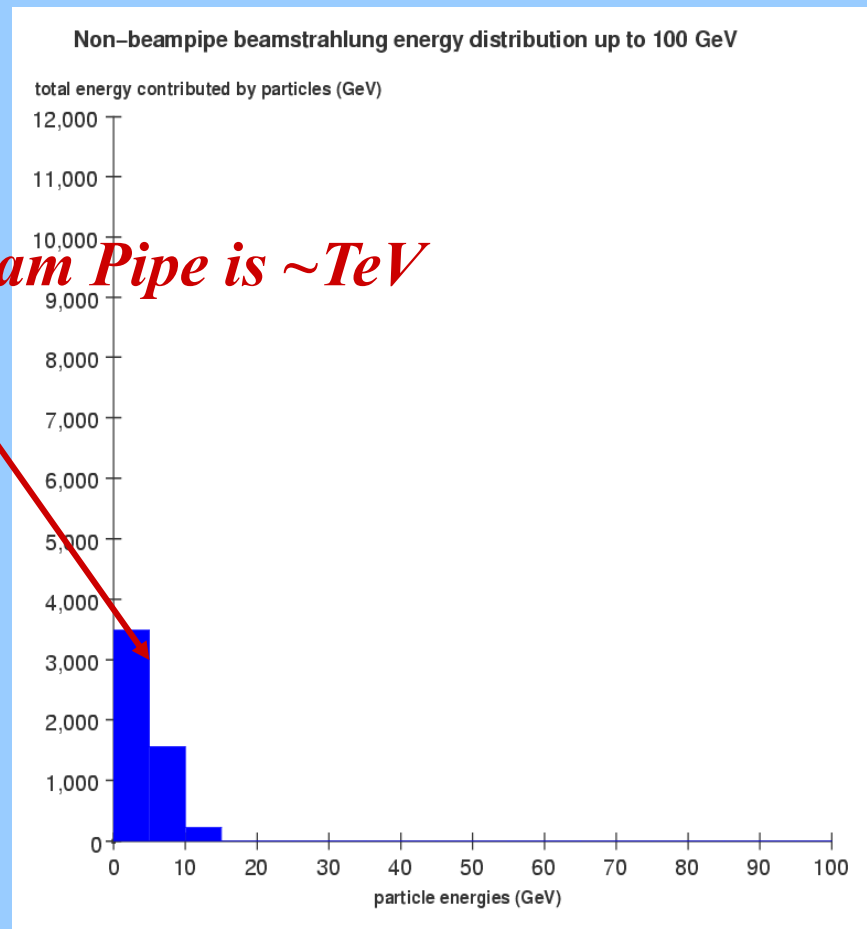


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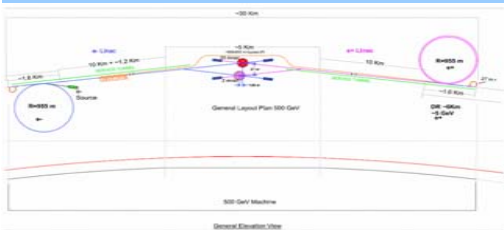
Integrated



Outside Beam Pipe



Energy into the Beam Pipe is ~TeV

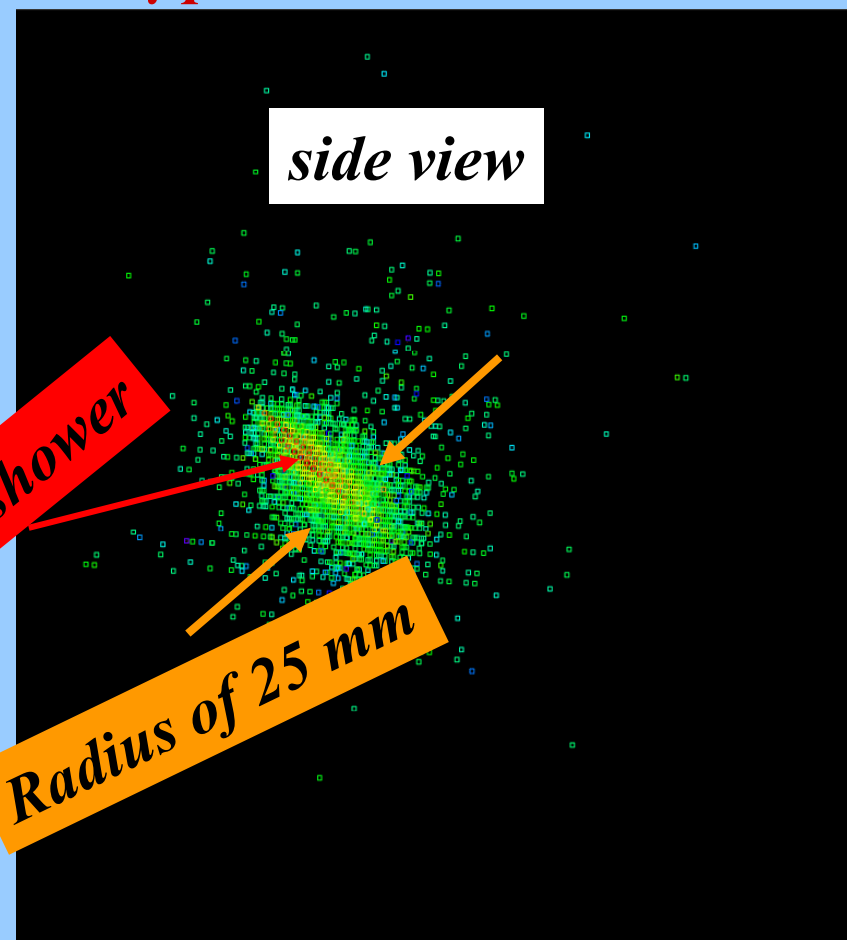
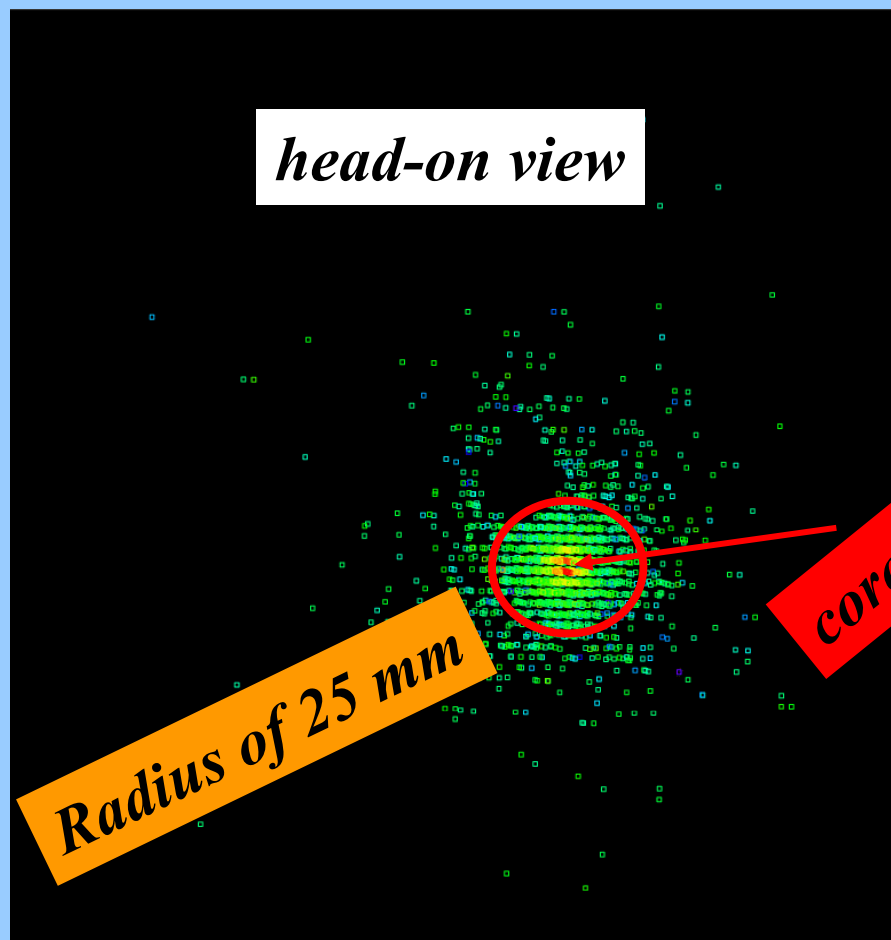


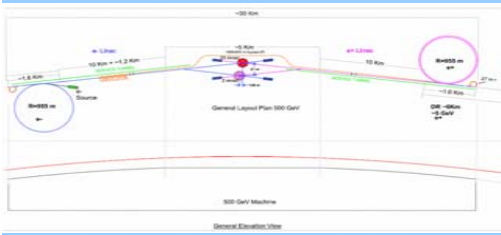
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Shower in Beamcal from 2 γ process alone





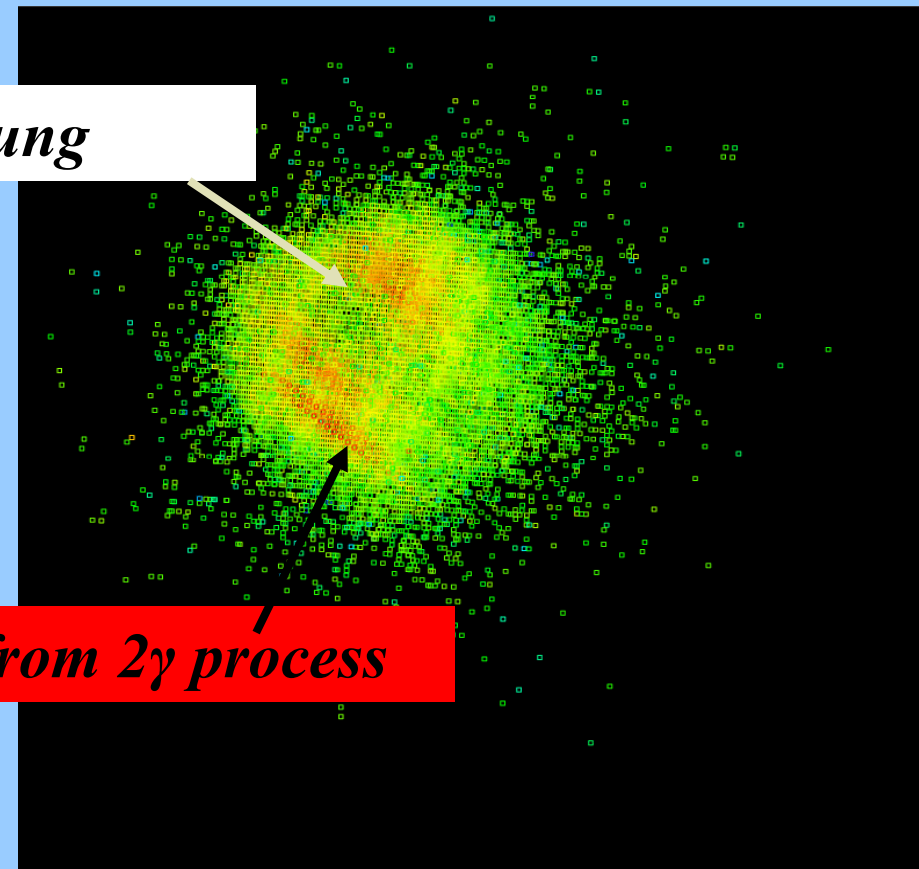
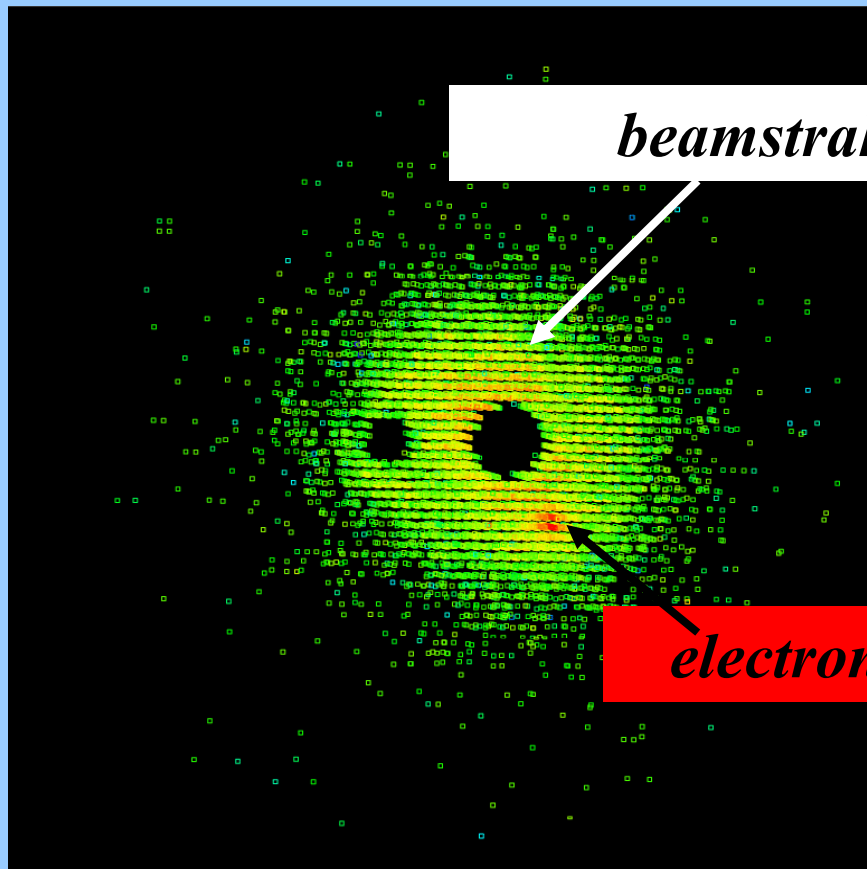
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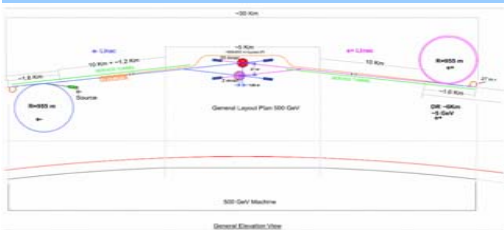
head on view

side view



beamstrahlung

electron from 2γ process

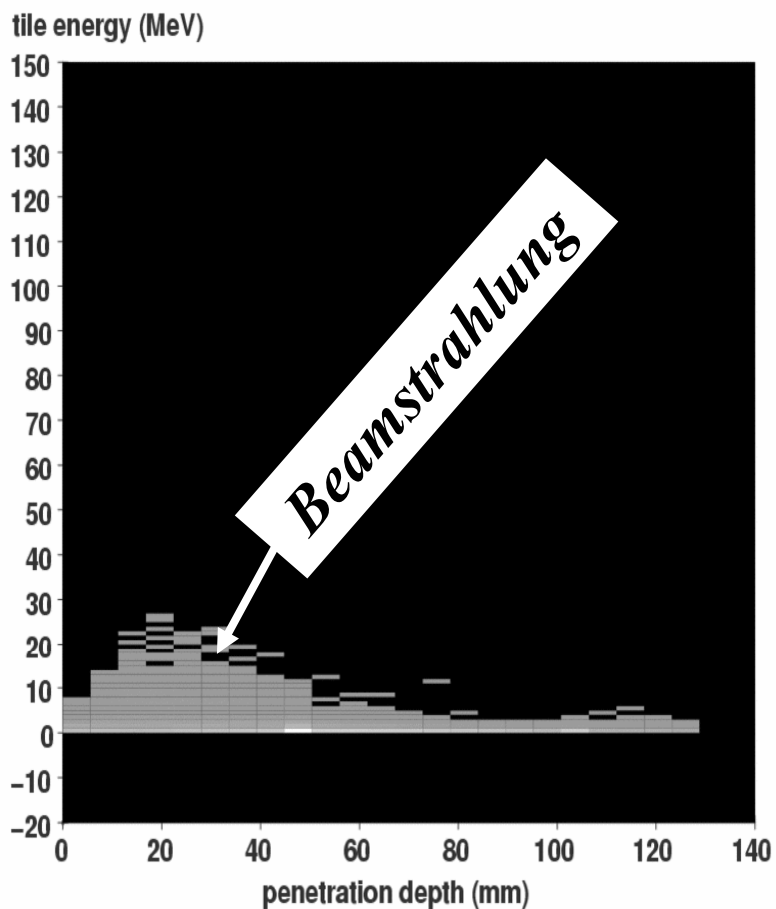


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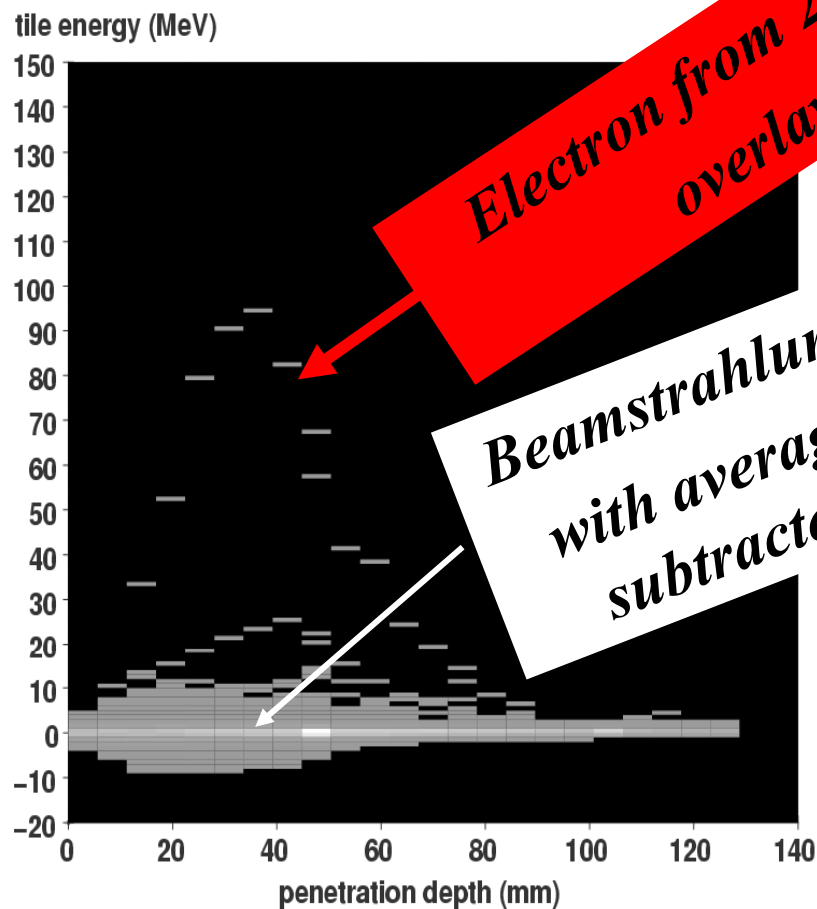


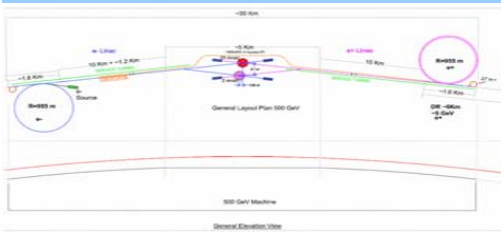
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Beamstrahlung Tile Energy



Subtracted Tile Energy

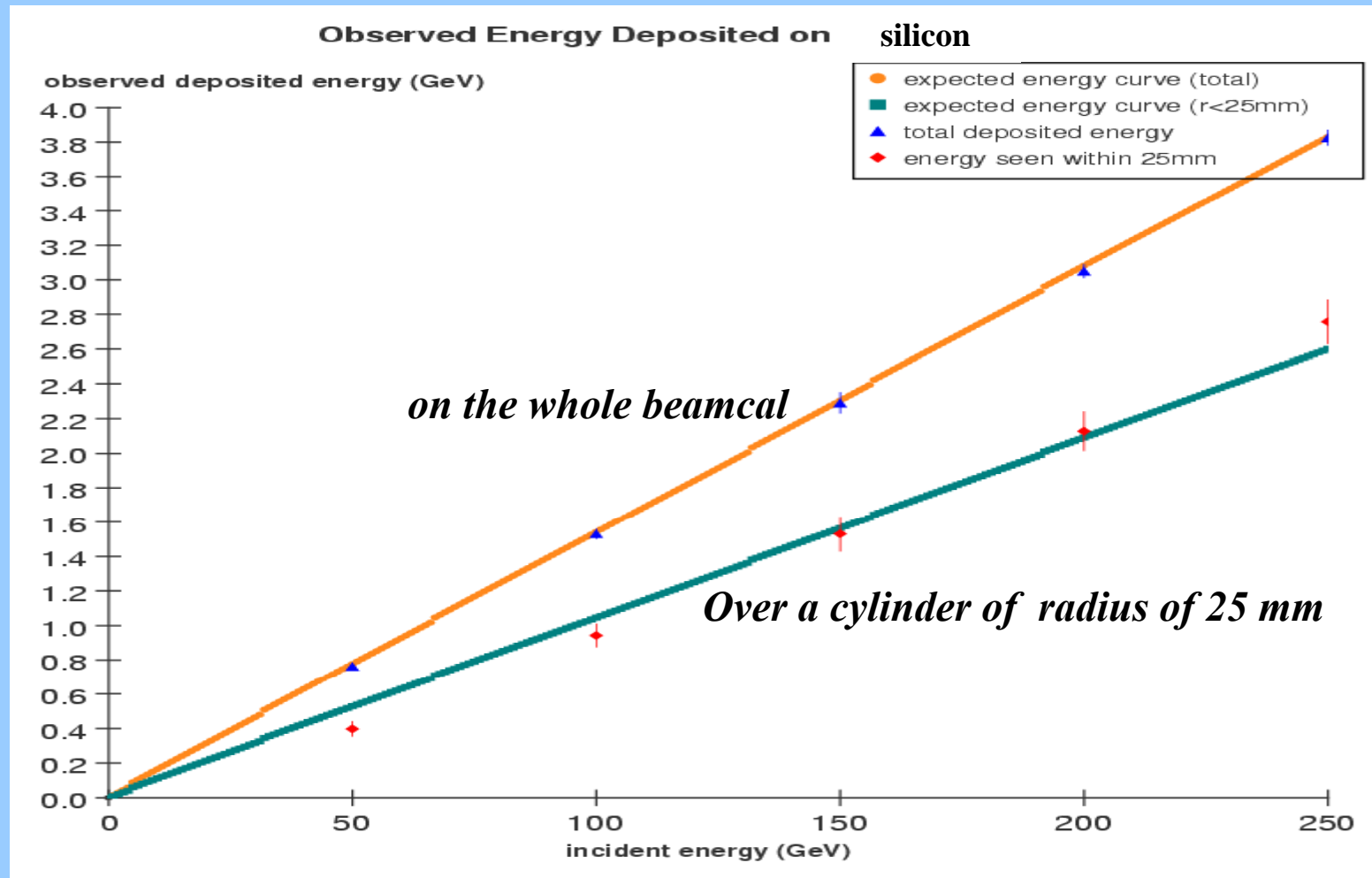


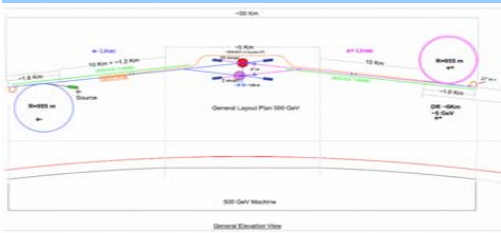


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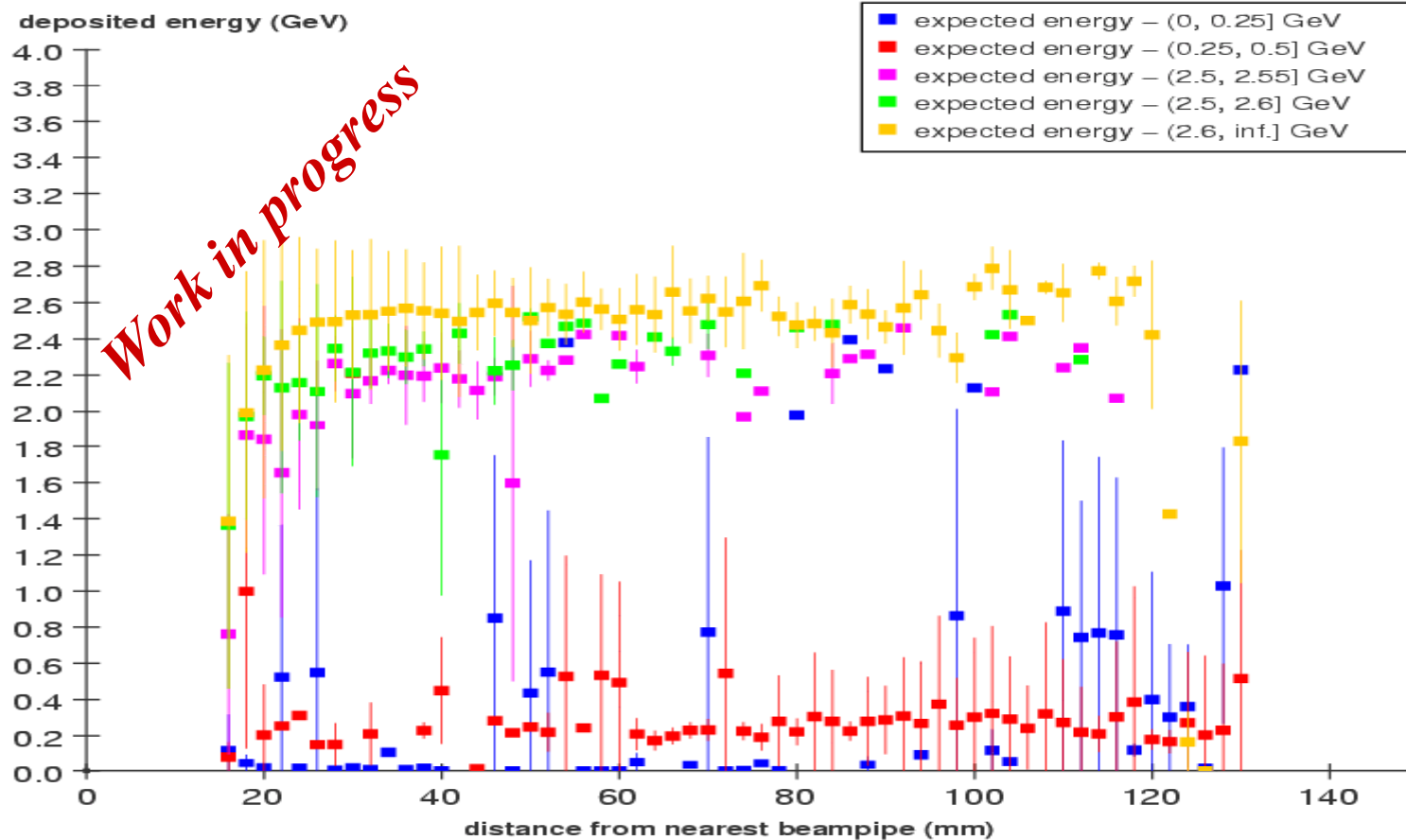
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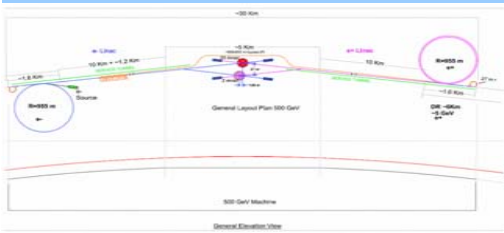


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Energy observed as a function of distance from center of beampipe

aida49216aida - Deposited Energy vs. Distance from Beampipe



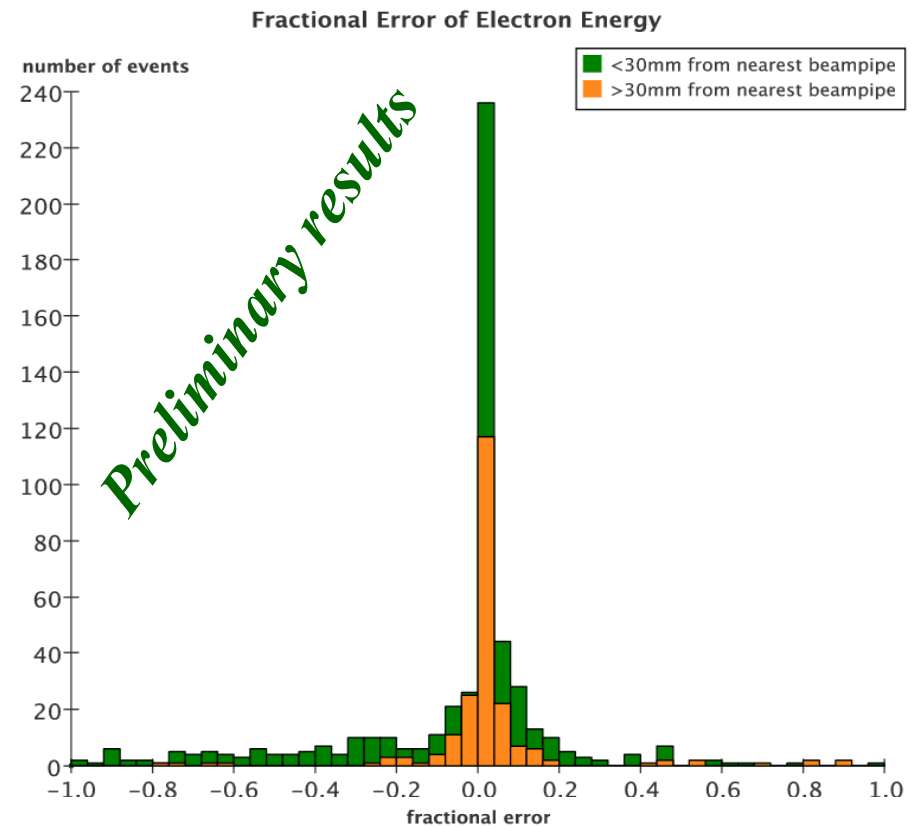
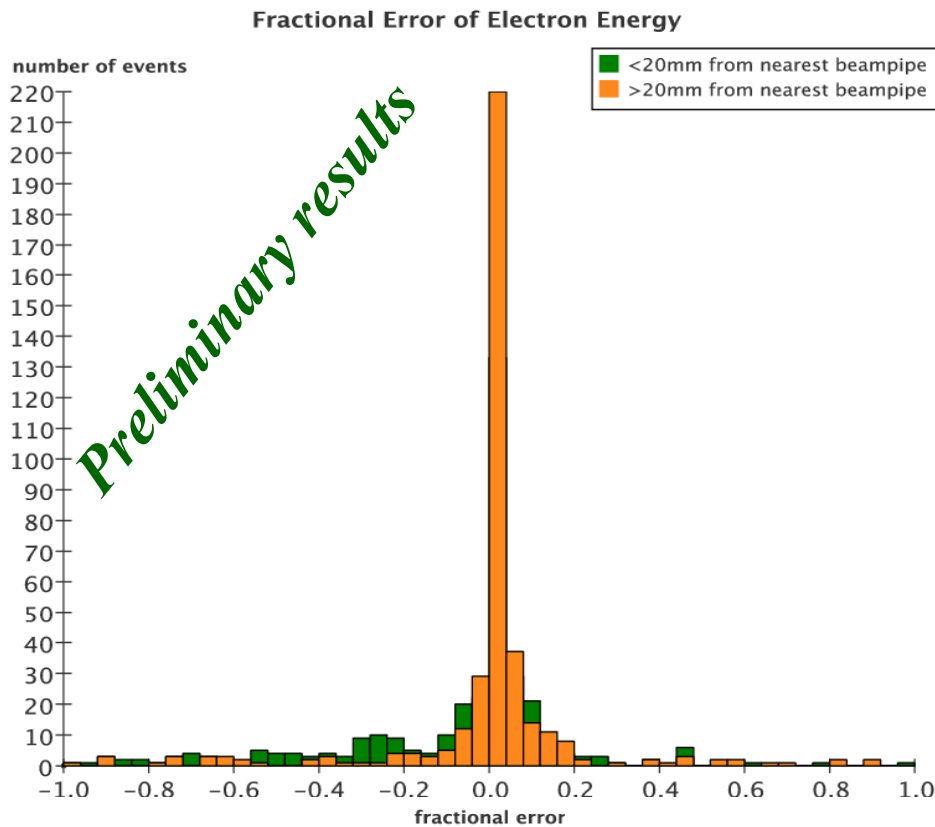


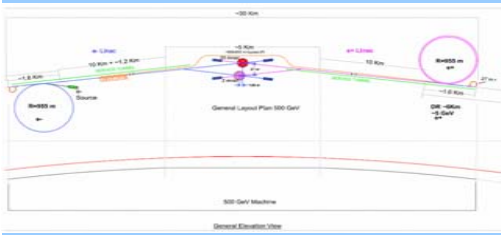
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Energy resolution of the reconstruction of the electrons from 2-photon events including the effects of beamstrahlung





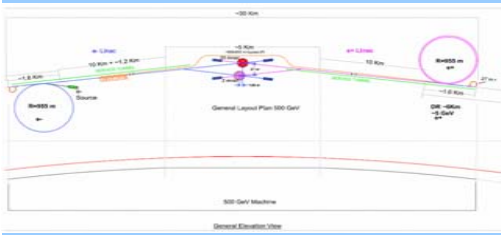
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Work to be Done

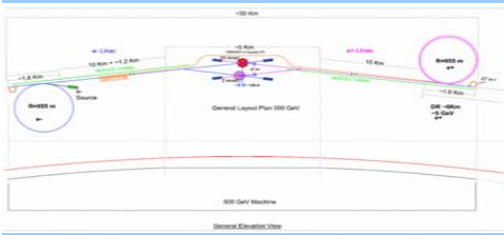
- *Optimize signal to Background.*
- *Check all our Calculations.*
- *Find other analysis techniques that reduce the beamstrahlung fluctuations and hence improve the signal resolution.*
- *Study the effect of this analysis on SUSY signal. Missing Pt limits.*



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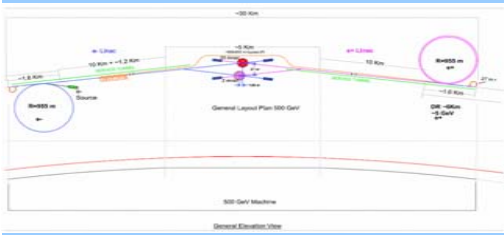
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