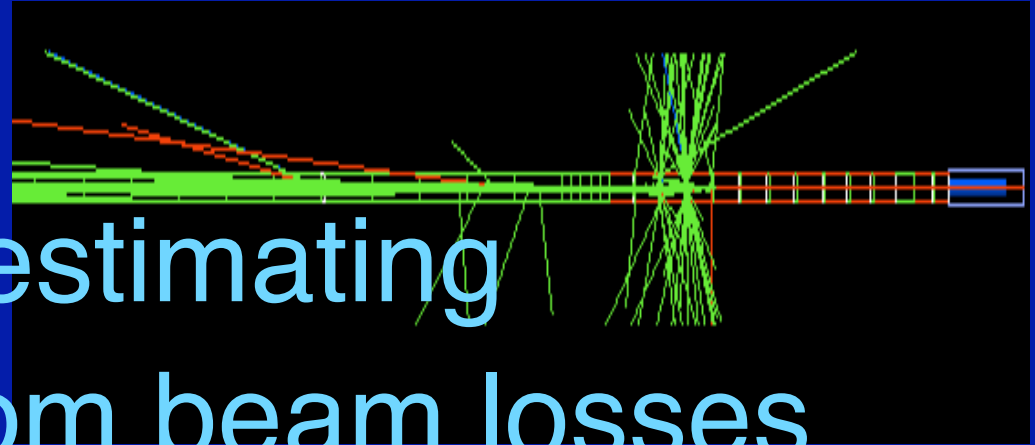# Towards estimating backgrounds from beam losses along the ILC extraction line case of 20mrad with high luminosity parameters

Olivier Dadoun

dadoun@lal.in2p3.fr

LCWS06 Bangalore, India

Royal Holloway
University of London

Ilya Agapov & John Carter

Overview

- Evaluation of backgrounds induced by disrupted beams (photon, e+e- pairs, neutron flux…), for different machine configurations and beam parameters

1. In the extraction beam lines: possible damage of beam magnets (John Carter talk)

2. In the detector: backscattering of background particles

Olivier Dadoun   LCWS2006

Disrupted beam energy

High Luminosity 1TeV, 80 nm offset (main+tail beam)

h1_core	
Entries	34912
Mean	390.961
RMS	97.6086

Use this set of parameters
for statistical reasons

35 K Particles

~25%

500K Particles

E (GeV)
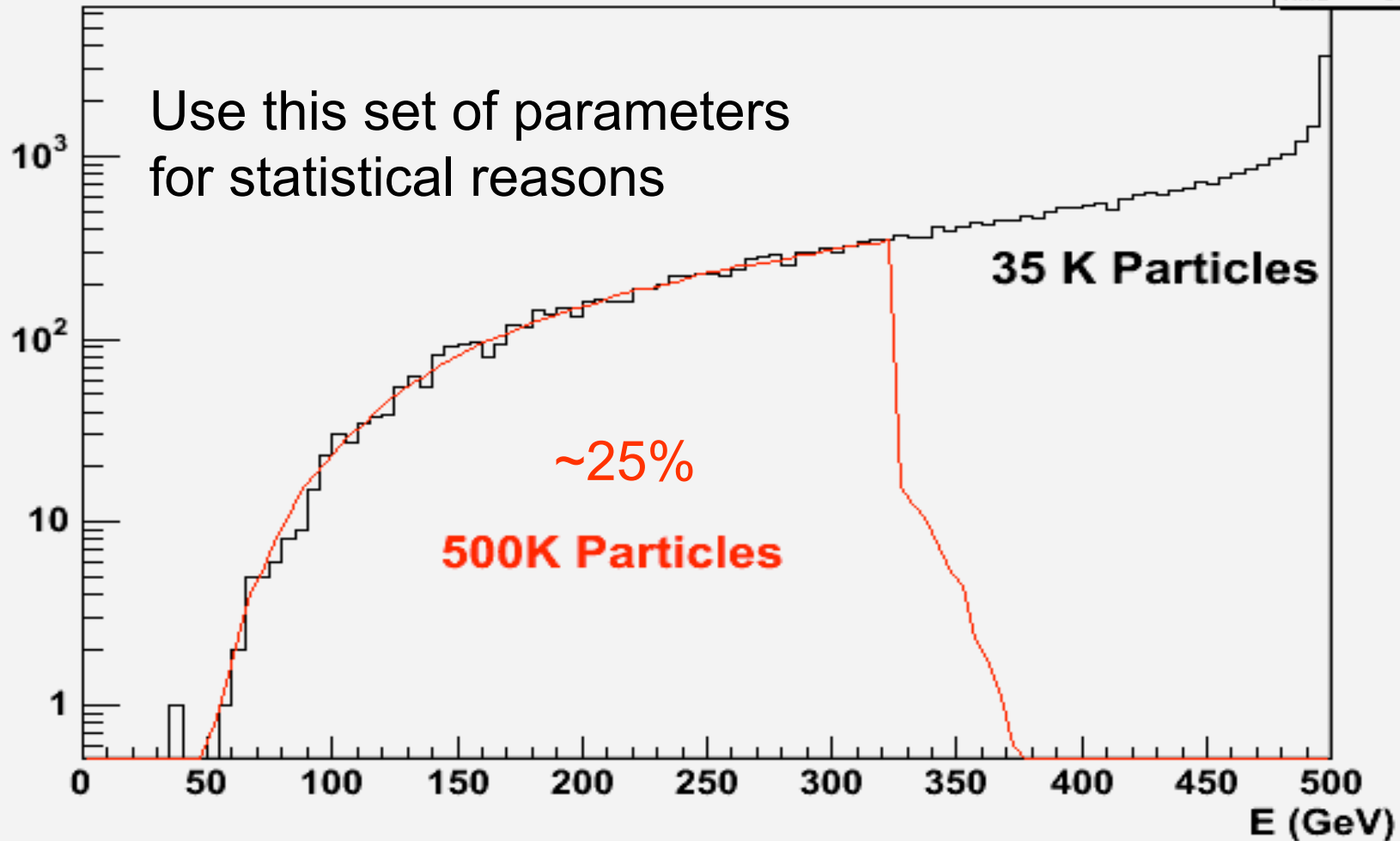
Power losses : 20mrad extraction

Beam parameters:
High luminosity 1TeV e.c.m, 80 nm offset, P~18 MW

dadoun, Fri Jan 6 12:12:27 CET 2006   BDSIM input file : 20mrad.gmad

SID detector concept

2 BDSIM SAMPLERS:
Z=3 m   and   Z=3.5 m

SiD, L*=3.5m

IP

20mrad

MASK 50cm of TUNGSTEN
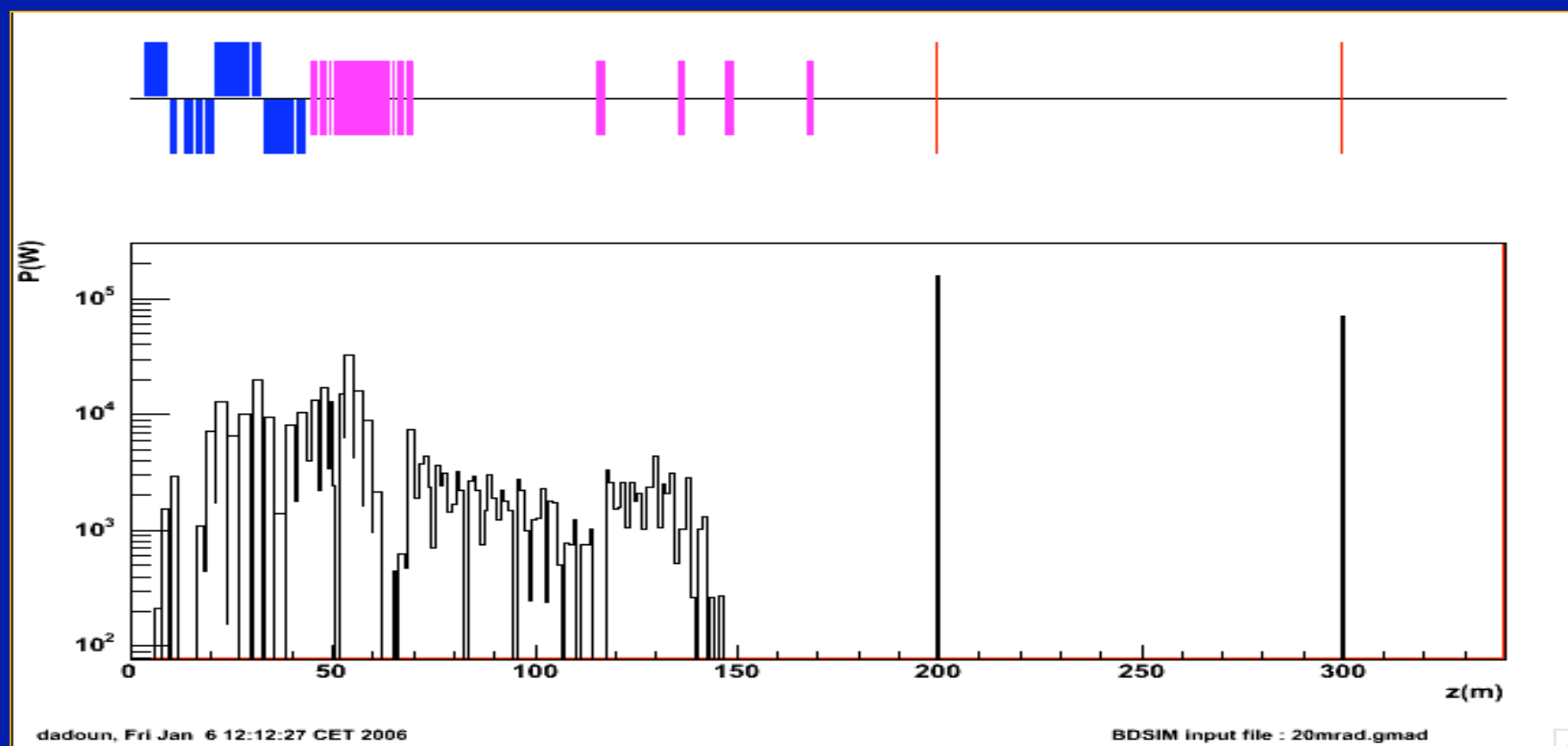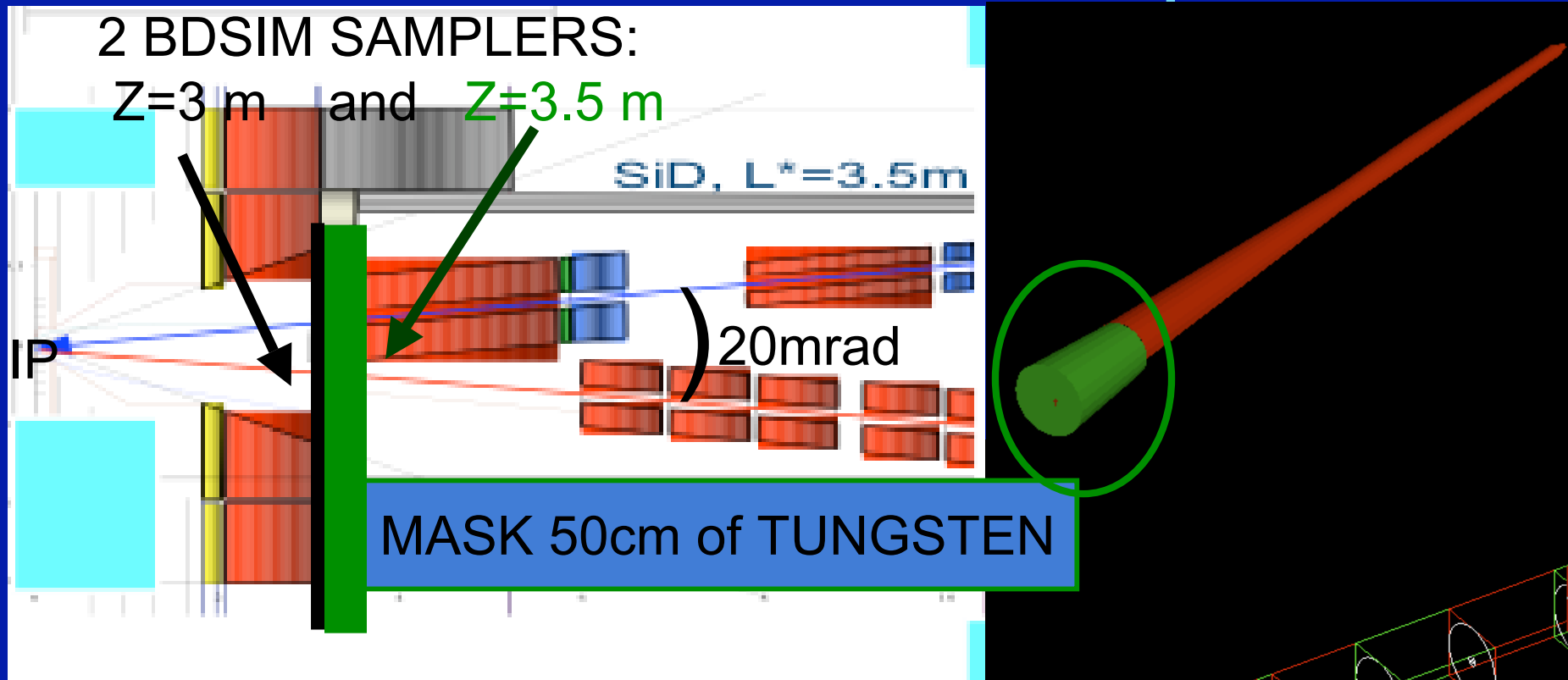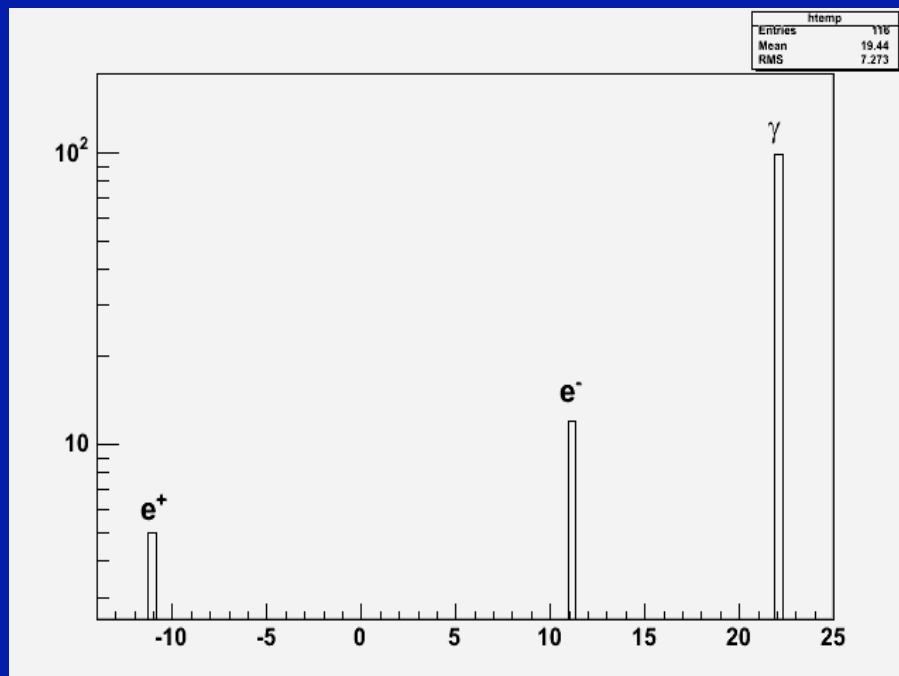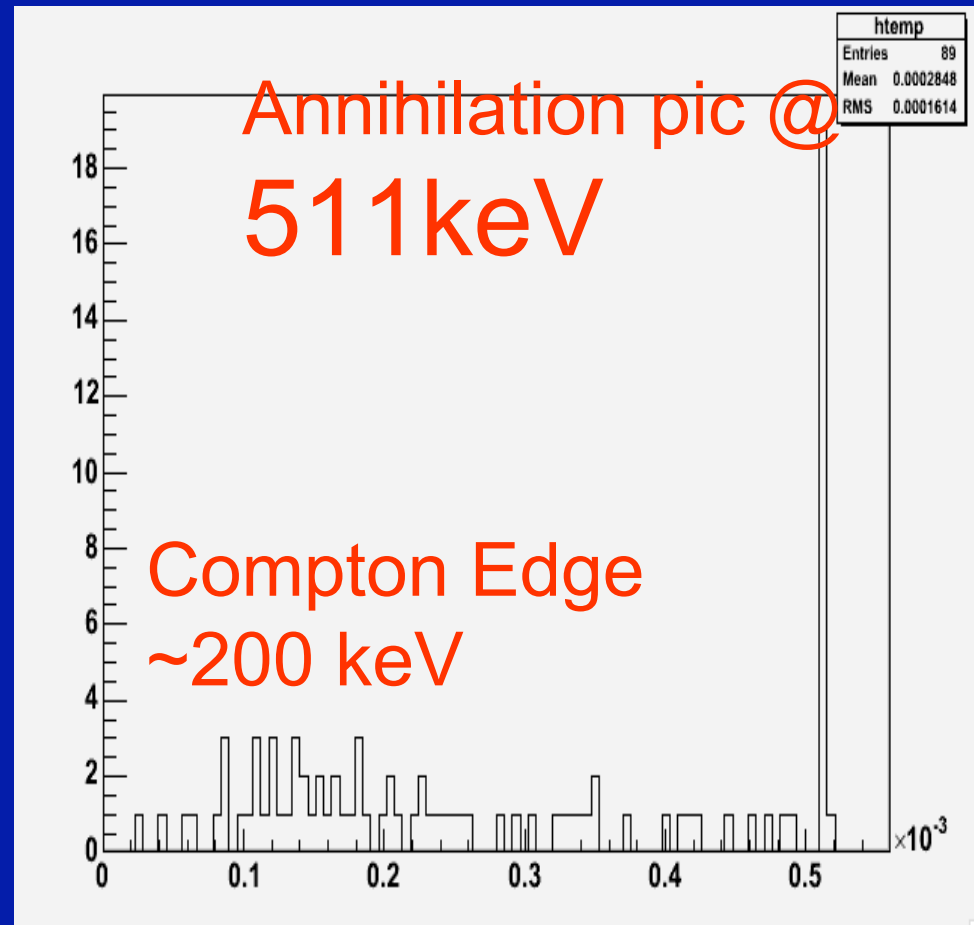
• Mokka MySQL detector description
 (including solenoid field)
• Connect to this 20mrad extraction line
in MAD format (gmad)

After the Mask @ z=3.5m

- 116 particles (Pz<0 i.e IP direction)
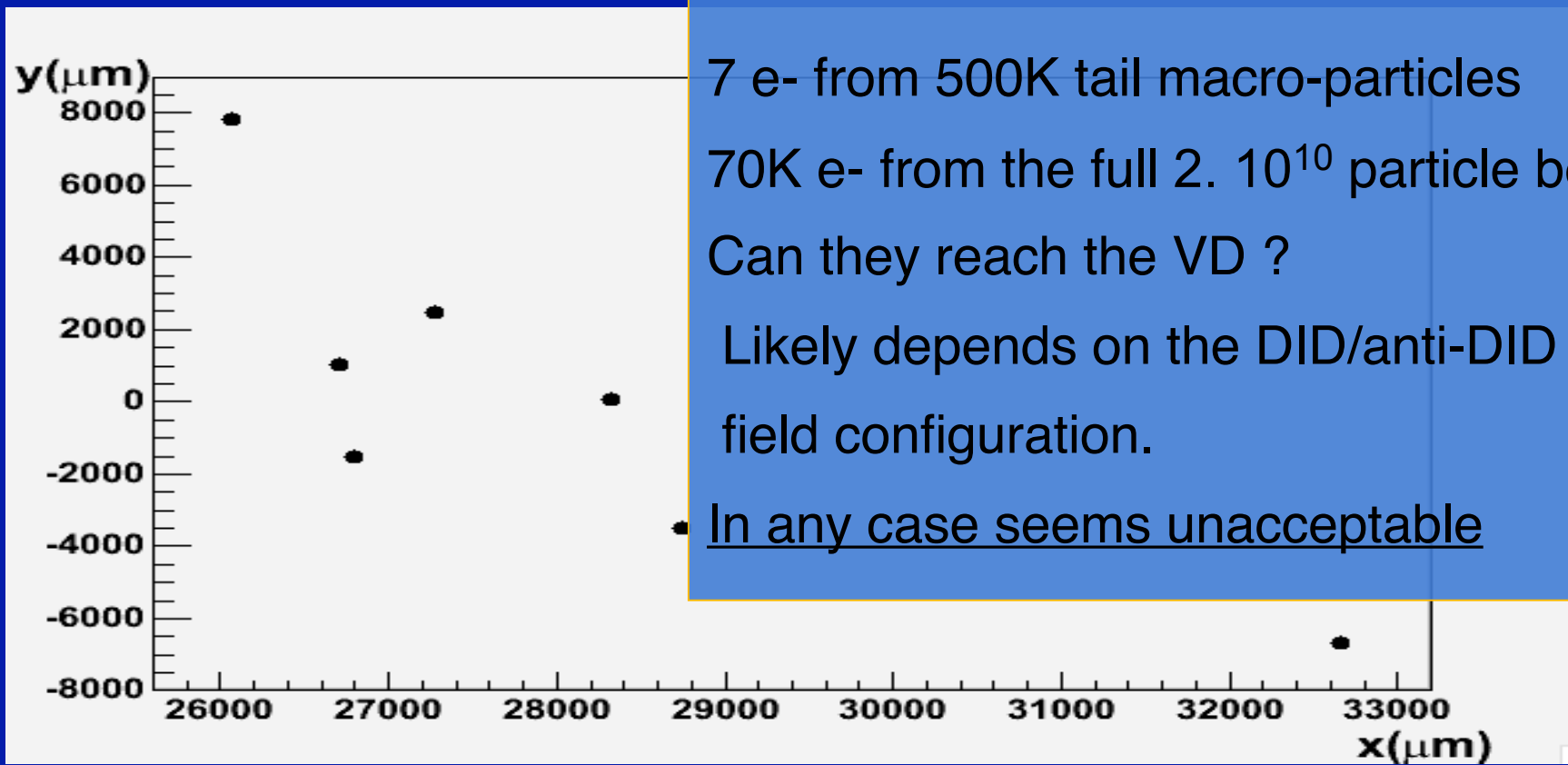- Essentially γ
- 95 % with E < 1MeV

Annihilation pic @
511keV

Compton Edge
~200 keV

Before the Mask @ z=3m

- No photons : absorbed in the tungsten
- 7 electrons with low energy (few MeV)

7 e- from 500K tail macro-particles

70K e- from the full 2. 10^{10} particle beam

Can they reach the VD ?

Likely depends on the DID/anti-DID

field configuration.

In any case seems unacceptable

Prospects

To run 500K in the tail (@ CC-IN2P3 computing center)

One week with 160 Jobs ~ 60 days for 2.8GHz Intel CPU 1024 KB

CPU TIME consuming !!!

Batch wait lot of time in queue (waste time)

1. Run BDSIM onto Data GRID (ILC virtual organization)
    may be we can win a factor of 10 on the CPU time:
    work in progress

2. Optimization of the secondaries tracking

Future:

*   Include power losses due to radiative Bhabhas

*   Comparison of background rates at the different detectors and
    for the different ILC beam parameters, for 20, 2 and 0 mrad
    crossing angle geometries

*   Customize the existing neutron propagation in Geant4 (CPU time)