Compton Polarimeter

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- Coherent Bremsstrahlung
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Spin Physics Workshope

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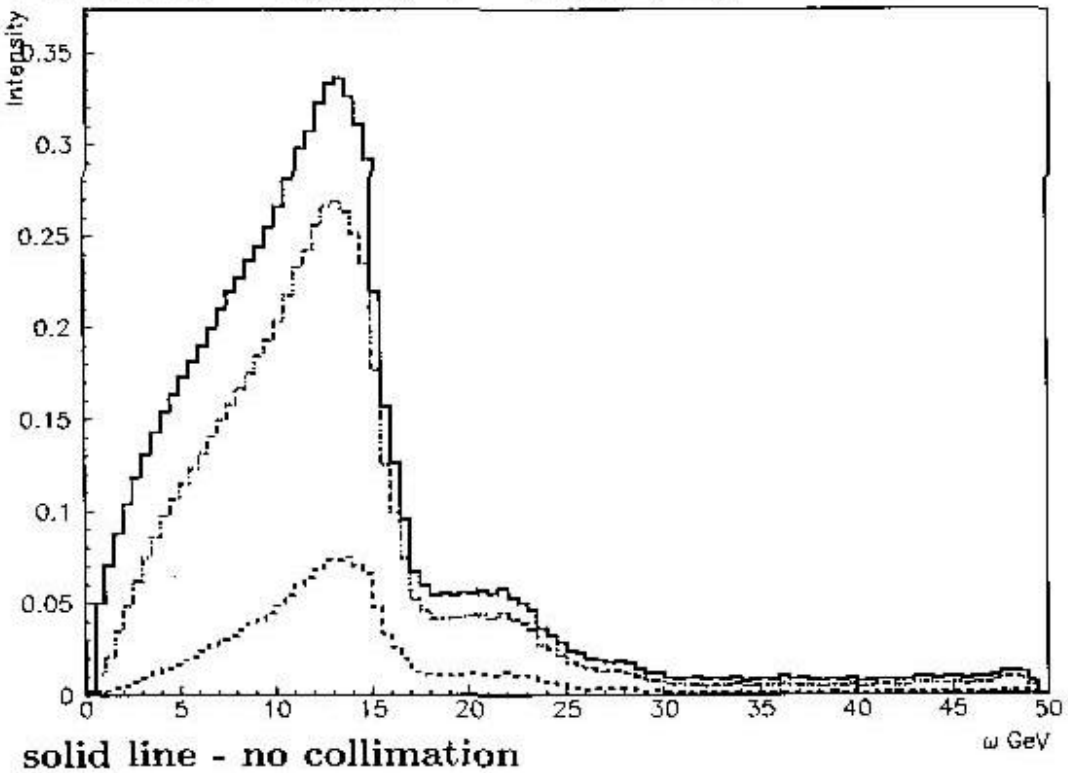
Coherent Bremsstrahlung:MC

$E_0 = 50GeV$: $\Delta\theta_h^l = 3.8\mu$**rad**, $\Delta\theta_v^l = 32\mu$**rad**,

$\Delta mosaicity = 15\mu$**rad**,$\Delta x^l = 0.08cm$, $\Delta y^l = 0.044cm$

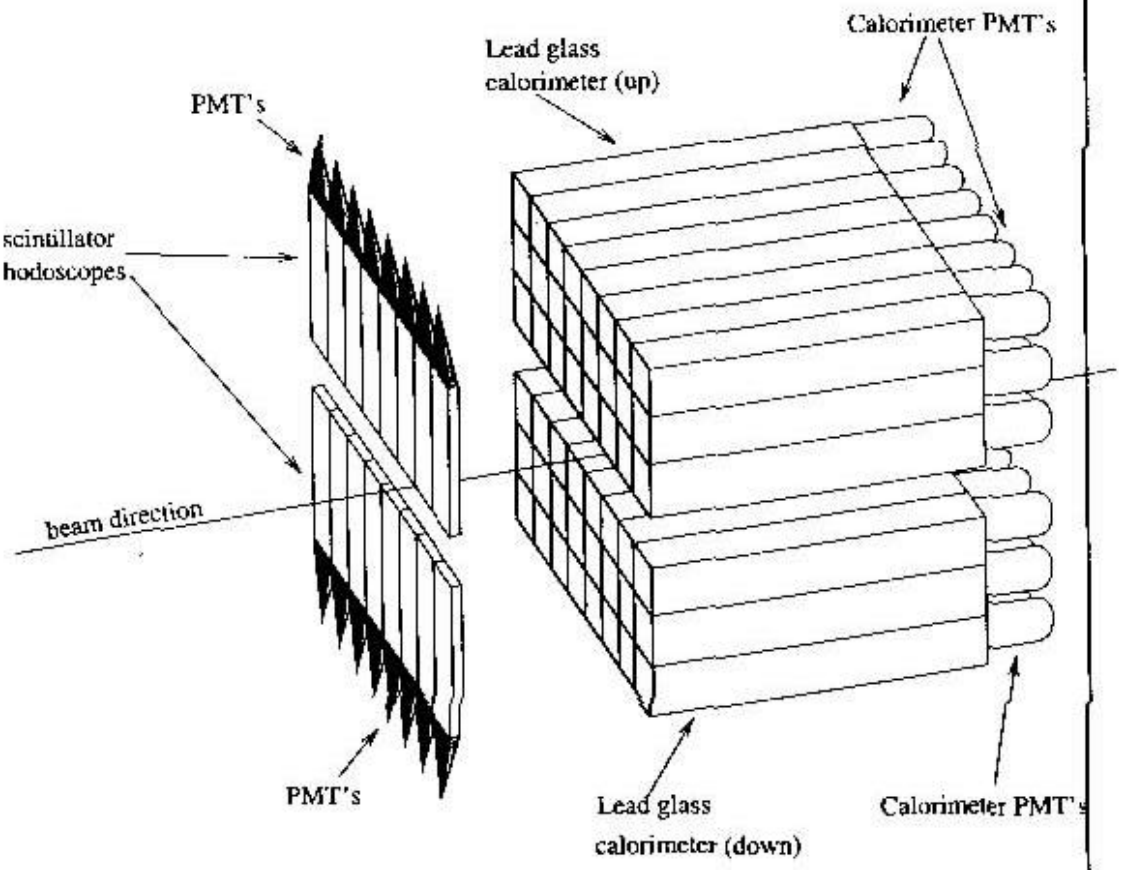


solid line - no collimation

dash-dot - collimation angle 10^{-5}.

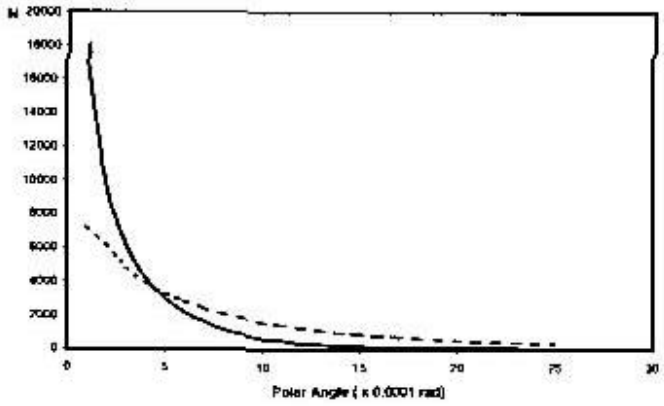
dashed - collimation angle 3.10^{-5}.

Polarimeter: Calo



Polarimeter: e^+e^- background

$E_0 = 10GeV$

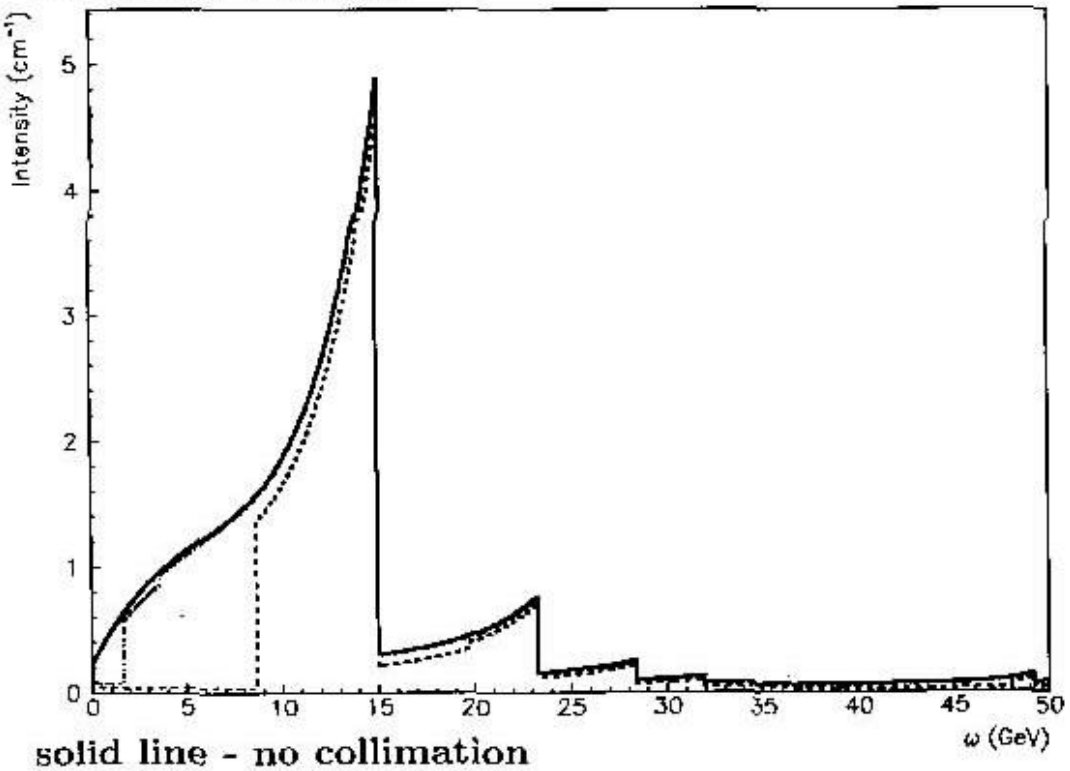


solid line - $E_{e^\pm}$ 600MeV

dashed - $E_{e^\pm}$ 200MeV

Coherent Bremsstrahlung:Theory

$E_0 = 50GeV$: **Theory**



solid line - no collimation

dashed - collimation angle mc^2/E

dash-dot - collimation angle $3mc^2/E$

Summary

- e^+, e^- do not cause a noticable background because under large angles there are only low energy particles, which will be swept out by the magnetic field.

Table 1: From proposal

z_{det}(m)	θ(mrad)	γ_{coh}/sp	k(GeV)	c/sp	time(hr)
4.5	6-20	$3x10^5$	8-14	1.5	0.5

- Taking into account the geometrical efficiency *for the detection* of electrons and photons simutaneously count/sp is equal to 0.3 and the time is 1 hour 40min
- A lead glass block with 4x4x40 could be used. Coordinate resolution *is getting worse from 5 to* 8mm.
- The dimension of the calorimeter could be increased in vertical dimension to cover larger angles of registration of electrons and photons.