**Bremmstrahlung process, photon beam polarization.**

Here we tried to simulate bremsstrahlung sperctrum of photons created by 25 MeV electrons in 1 mil Al, to observe the polar angle distribution of photons, and to callculate the polarization degree of the photon beam for some specific polar angle.

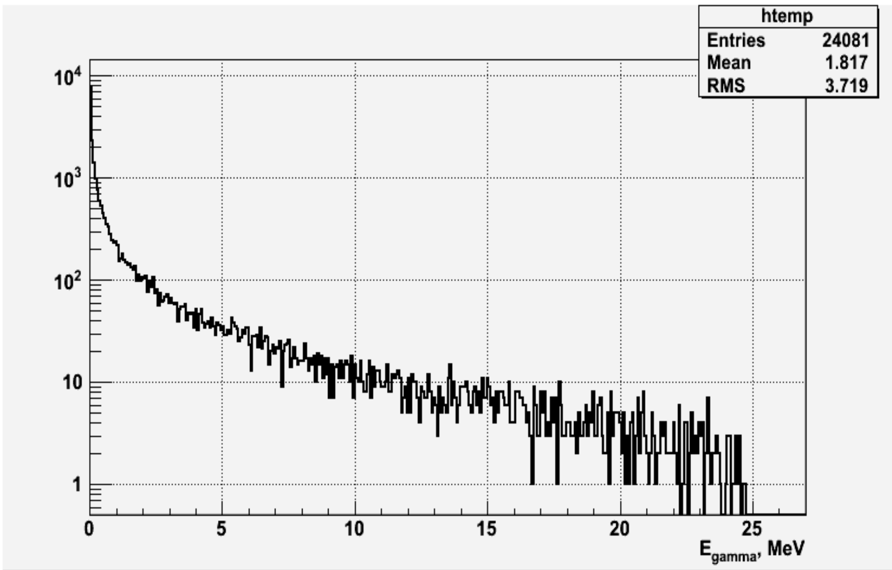


**Fig .1.** Bremsstrahlung photons energy spectrum. Ee = 25 MeV. 1 mil of Al(Z=13).

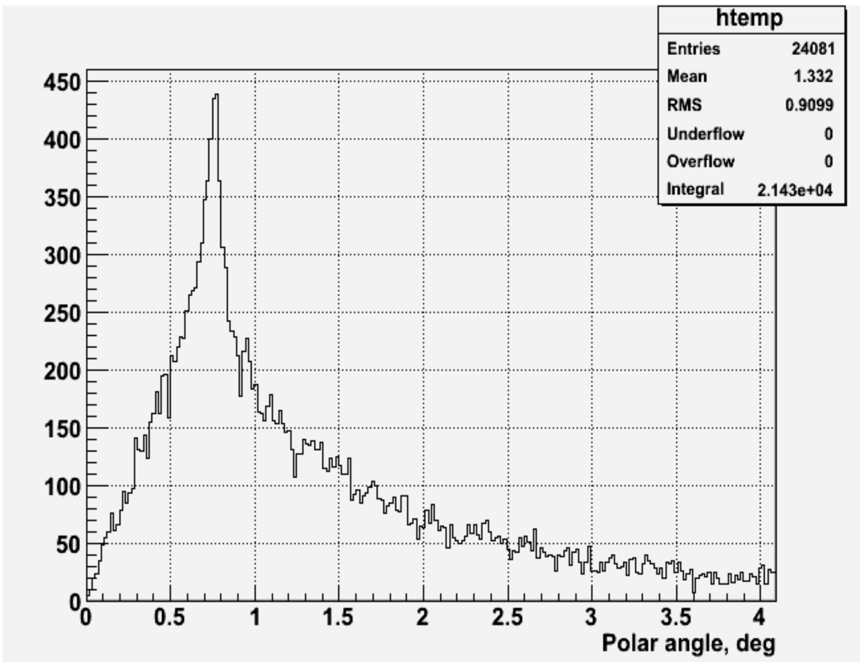


**Fig. 2.** Polar angle distribution for bremmstrahlung photons.

We collimate at $\theta$ = Me/Ee = 0.511/25 = 1.17 deg. So, we do not get the best photon intensity (according to the current simulation).

It is interesting to see what the polarization degree of the photons at some certain polar angle. This will help us to understand where we should cillimate our photon beam.

To calculate the polarizatoin degree of bremsstrahlung photons, the following paper was used:

Olsen and Maximon, *Photon and Electron Polarization in High-Energy Bremmstrahlung and Pair Production with Screening*, Phys. Rew. **114**, 3, May 1, 1959 (expression 7.3 w/ 6.34 in the paper).

The results are PRELIMINARY and should be discussed (see Fig. 3. below). The Coulomb screening was taken into account.

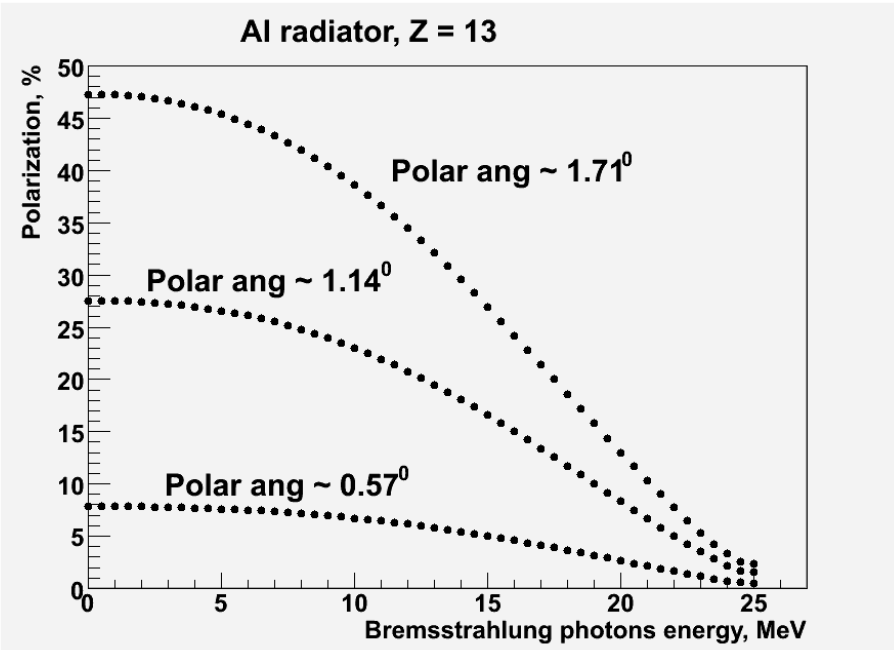


**Fig. 3.** Photon beam polarization vs. photon energy.

Giessen group said that the angle $\theta = Me/ Ee$ is optimal. Did they mean that the ratio of photon intensity vs. photon polarization is optimal or that the polarization degree is the highest at

$$\theta = Me/ Ee?$$

If Fig. 3. makes sense, that means that the polarization is higher at higher photon polar angles, however, we should keep a balance and get some reasonable photon intensity in order to get good statistics.