## **ECal Pi0 Acceptance**

Using GEMC simulation of HPS, I simulated 100 000 pi0 originating from two different vertexes: the target position and the proposed extra target position (1m in front of the usual one placed on the photon beam line).

(There is no background included in this simulation)





The reconstructed distributions (MeV, MeV, degrees) for the normal target:





The reconstructed distributions (MeV, MeV, degrees) for the advanced target:



## **Conclusions:**

- The advanced target gives much larger acceptance, but needs large angles to cover the whole ECal.
- The best energy for the advanced target is around 1 GeV and extend to the lower energy. This is important for the 2.2 GeV energy run.
- The normal target gives few pi0 (~2% acceptance) with better efficency for high energy (>1 GeV) low angle (~5 degrees) pi0.
- The normal target gives a better coverage of the calorimeter and the reconstructed events give an almost complete coverage of the crystals.
- TODO: evaluate pi0 production cross section to estimate the expected rates for direct electron beam and for the secondary photon beam.