First look at positron-annihilation setup

• Geometry updated + more efficient sampling of particles traversing the trigger detector (efficiency 50% now)
• Compared two setups:
  – one with the direct beam in the detector
  – one with positrons deflected by the magnet
• Triggering on plastic 0 and 1 and vetoing using plastic 2 behind annihilator
• In real life, events without veto (downscaled) will be recorded for normalization purpose
• 12 cm (4 layers) of annihilator blanket
Energy of highest energy gamma-ray

Sum of two gamma-ray energies

black: positrons
red: electrons

Important background from bremsstrahlung (2/3 of events): the radiating electron is left with very little energy and is stopped within annihilator or misses the veto.
- magnet on
- dump in
- condition on position
Energy of highest energy gamma-ray

Sum of two gamma-ray energies

black: positrons
red: electrons

140 events (out of 250 000) pass the cuts: probability: $\sim 6 \times 10^{-4}$

Possibility of using a thicker “annihilator” slab (Al for instance)

Possibility of running at high rate (1-2 kHz), limitation arises from pile-up in CsI pulses

We will have to run with and without annihilator to estimate the background.