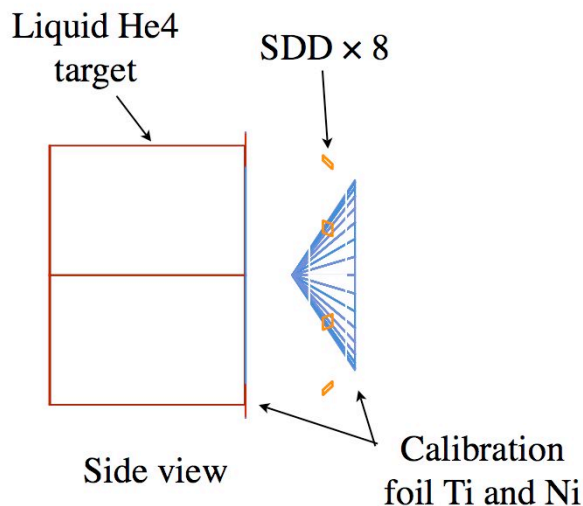


8/Dec/2006 Hideyuki Tatsuno

Compton scattering effect in the helium target

GEANT4 simulation
E570 setup

X-rays are generated in the target uniformly



The resolution is assumed as
a function of “constant noise”
and “Fano factor”

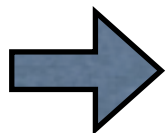
170 eV FWHM@TiK α 1

Incoherent scattering cross section of Liq-helium-4

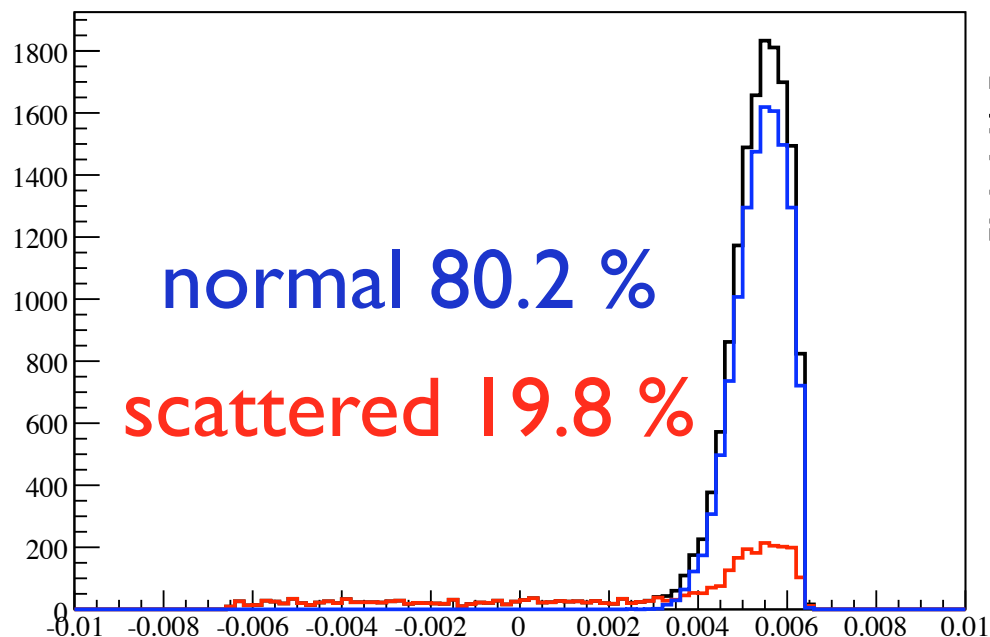
Liq-He-4 density = 0.145 g/cm³
 A = 4.003 g/mol
 Na = 0.218×10^{23} Atom/cm³

photon energy [keV]	barn/Atom
6.00	0.8385
8.00	0.9785
10.0	1.059
15.0	1.145

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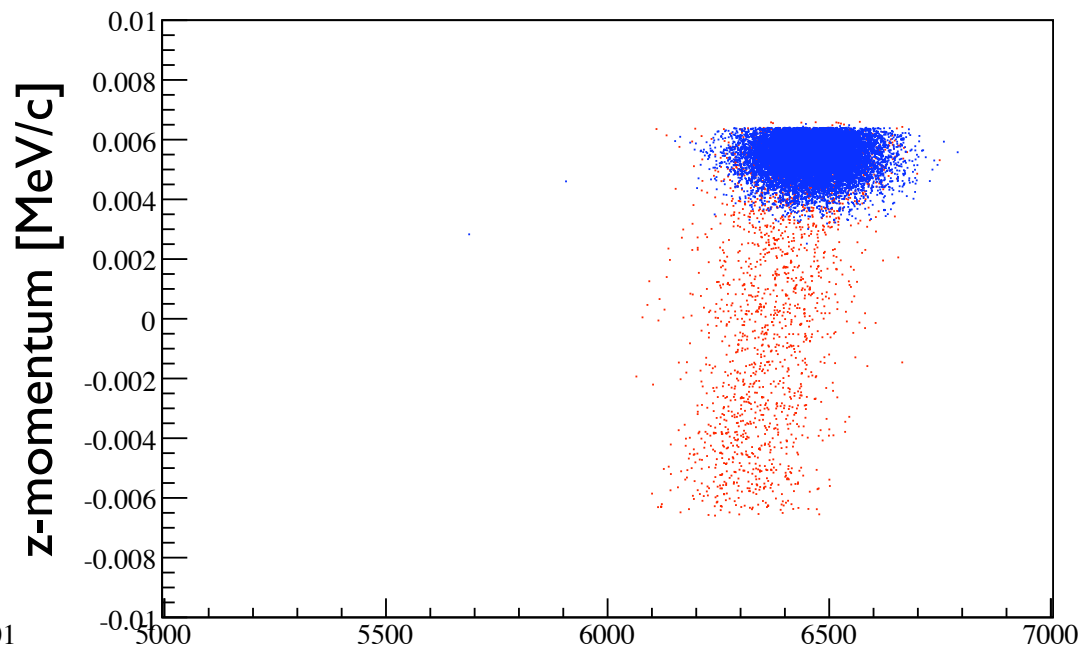
reaction rate of 1 cm thickness of liquid helium-4
~ 1- exp{-0.0218} = 2.16 [%]



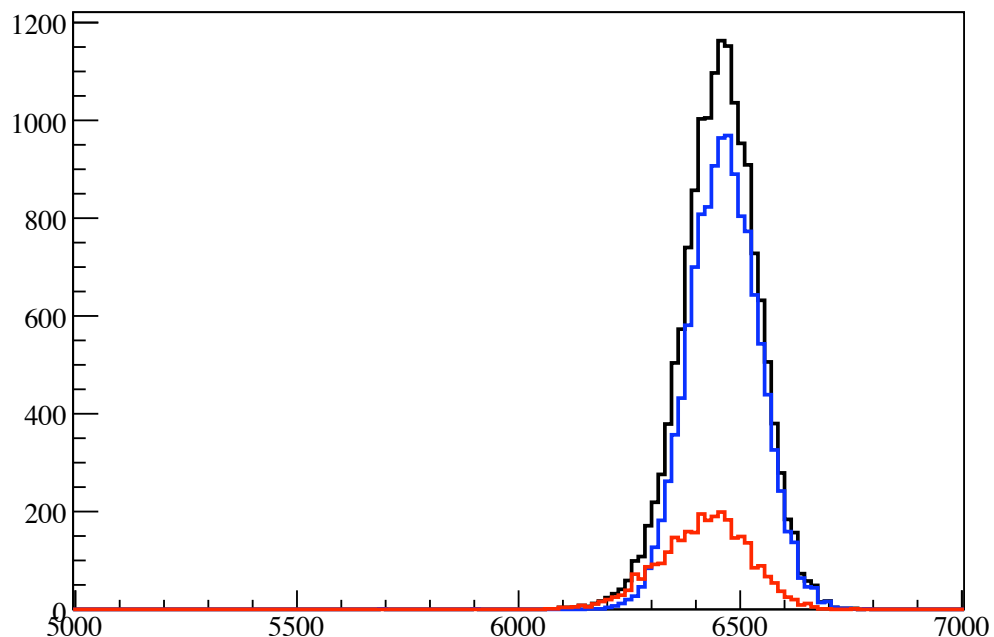
z-momentum at generated position [MeV/c]

KHeXL α (6464.0 eV)

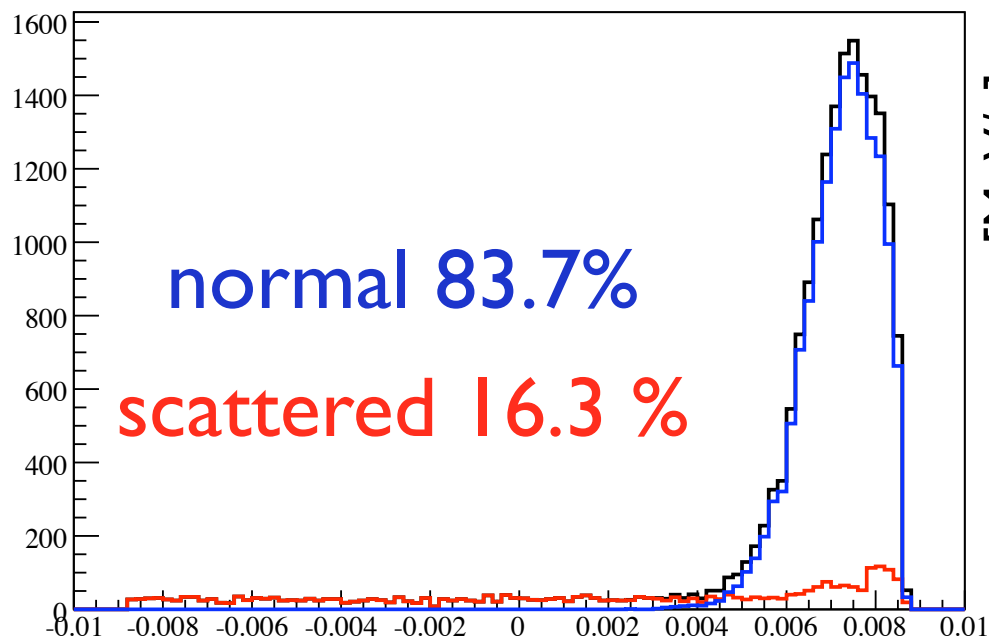
This lower-side tail cause
~ -9 eV shift on the
centroid of the Gaussian.



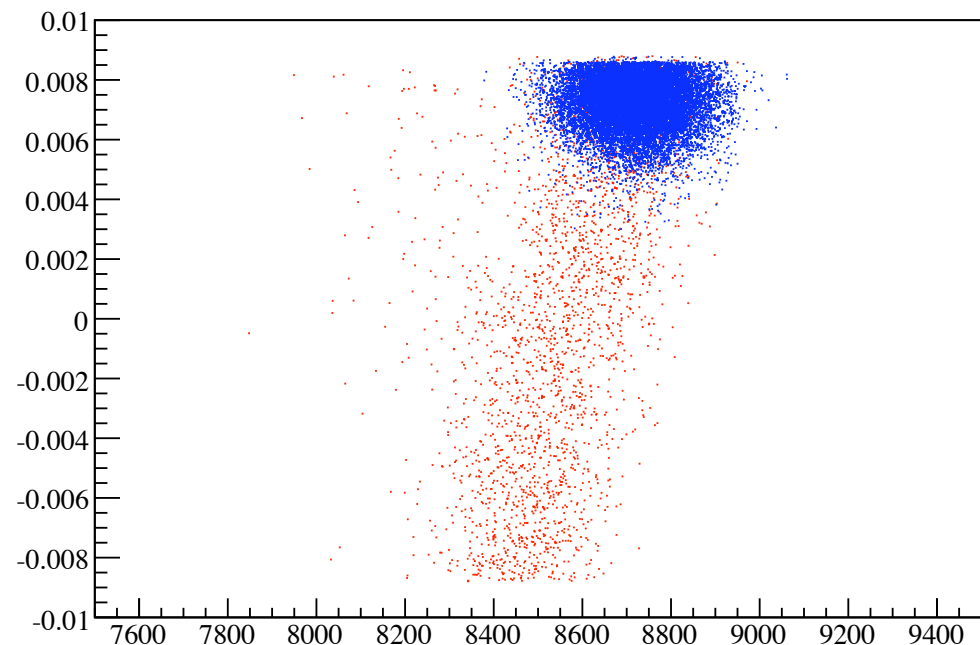
Energy [eV]



Energy [eV]



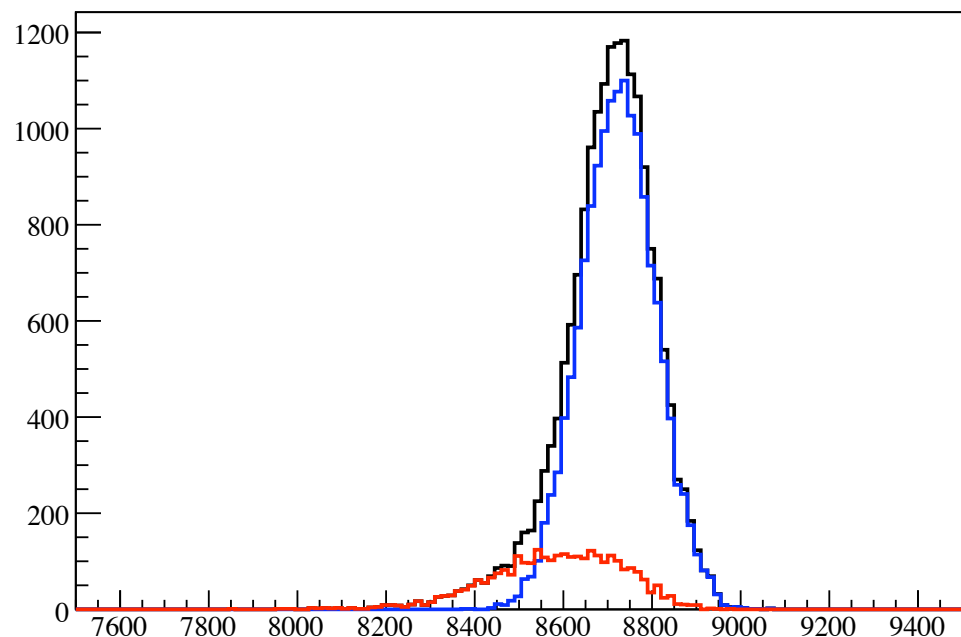
z-momentum at generated position [MeV/c]



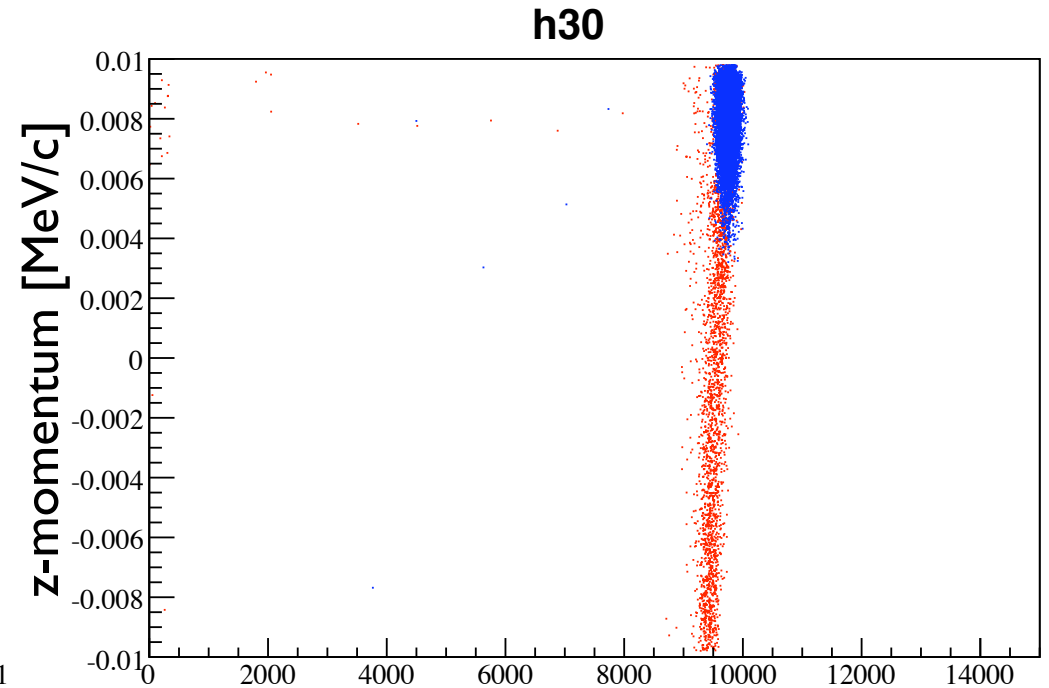
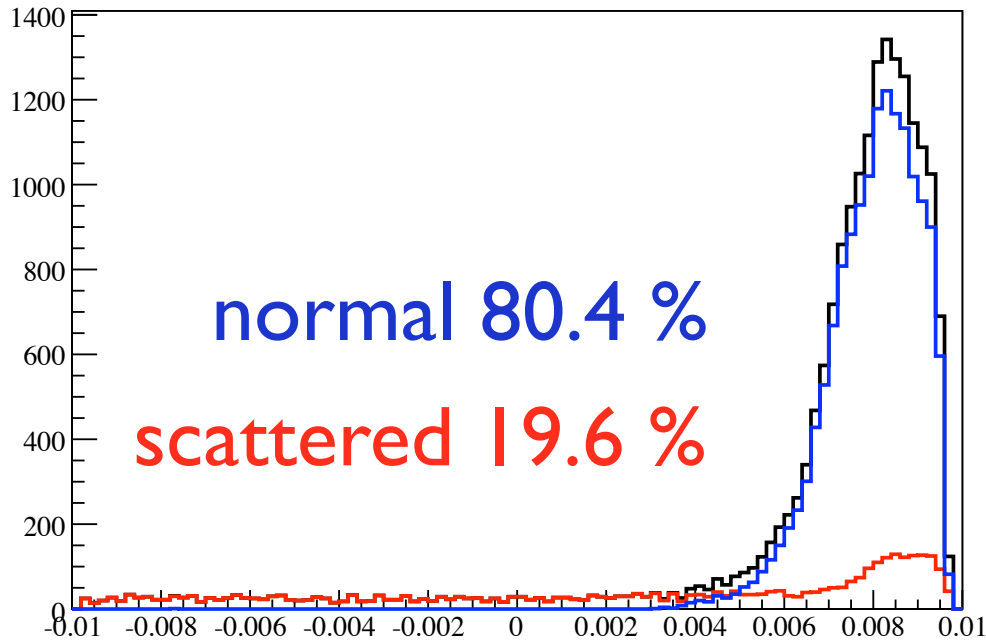
Energy [eV]

KHeXL β (8723.0 eV)

This lower-side tail cause
 ~ -12 eV shift on the
 centroid of the Gaussian.



Energy [eV]

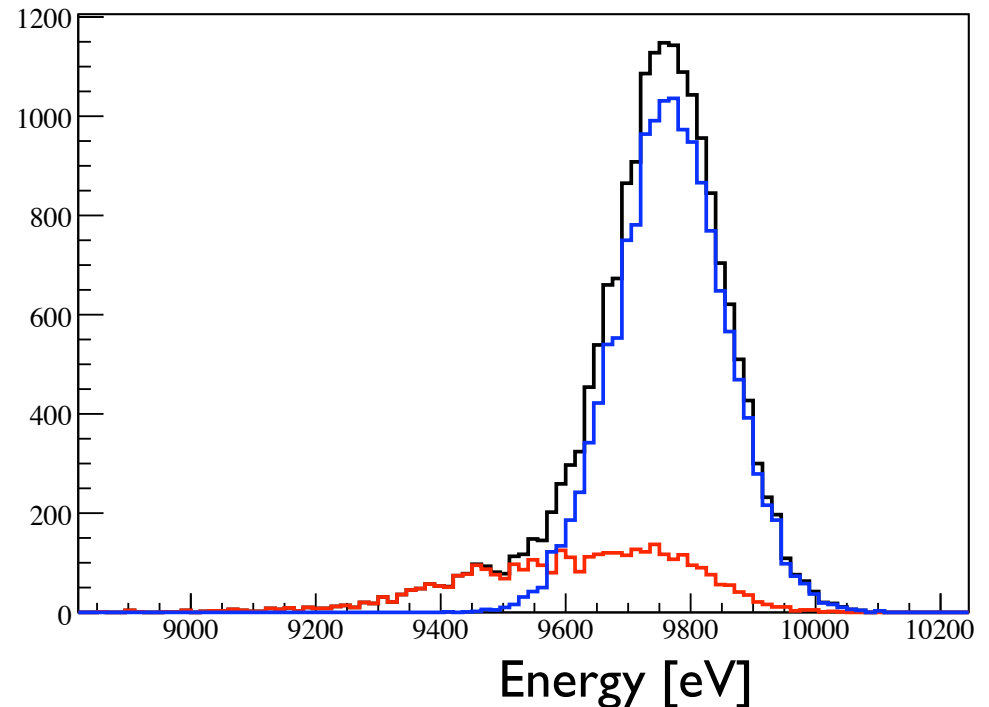


z-momentum at generated position [MeV/c]

Energy [eV]

KHeXL γ (9768.0 eV)

This lower-side tail cause
 ~ -10 eV shift on the
 centroid of the Gaussian.



Energy [eV]