GEANT4 simulation
latest version 4.8.2

- Low Energy package

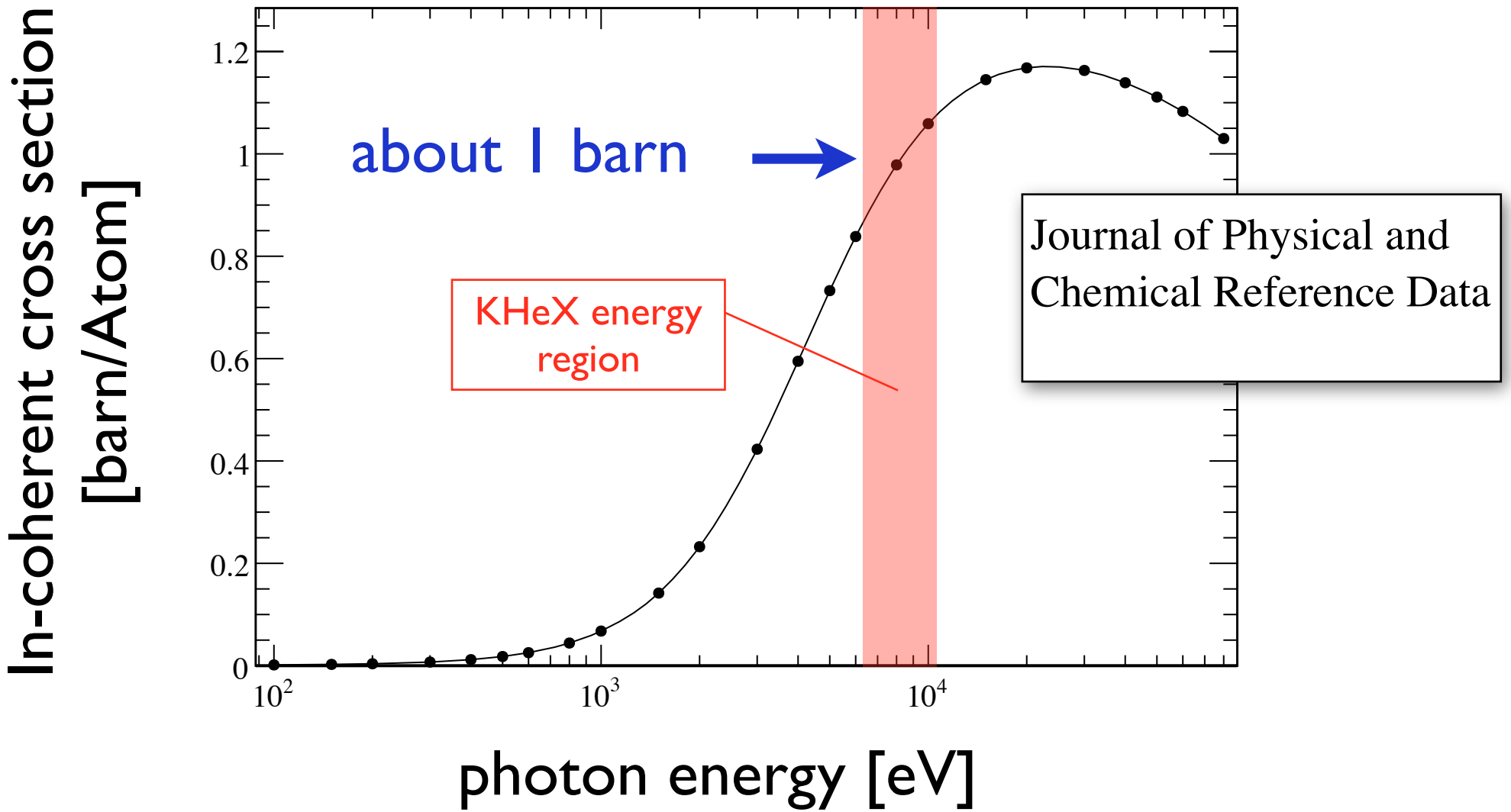
  Deal with ~100 eV threshold for EM interactions
  Include atomic states, Auger process, X-ray fluorescence
  Consider Rayleigh scattering process

- Low Energy Compton Scattering (LECS) package

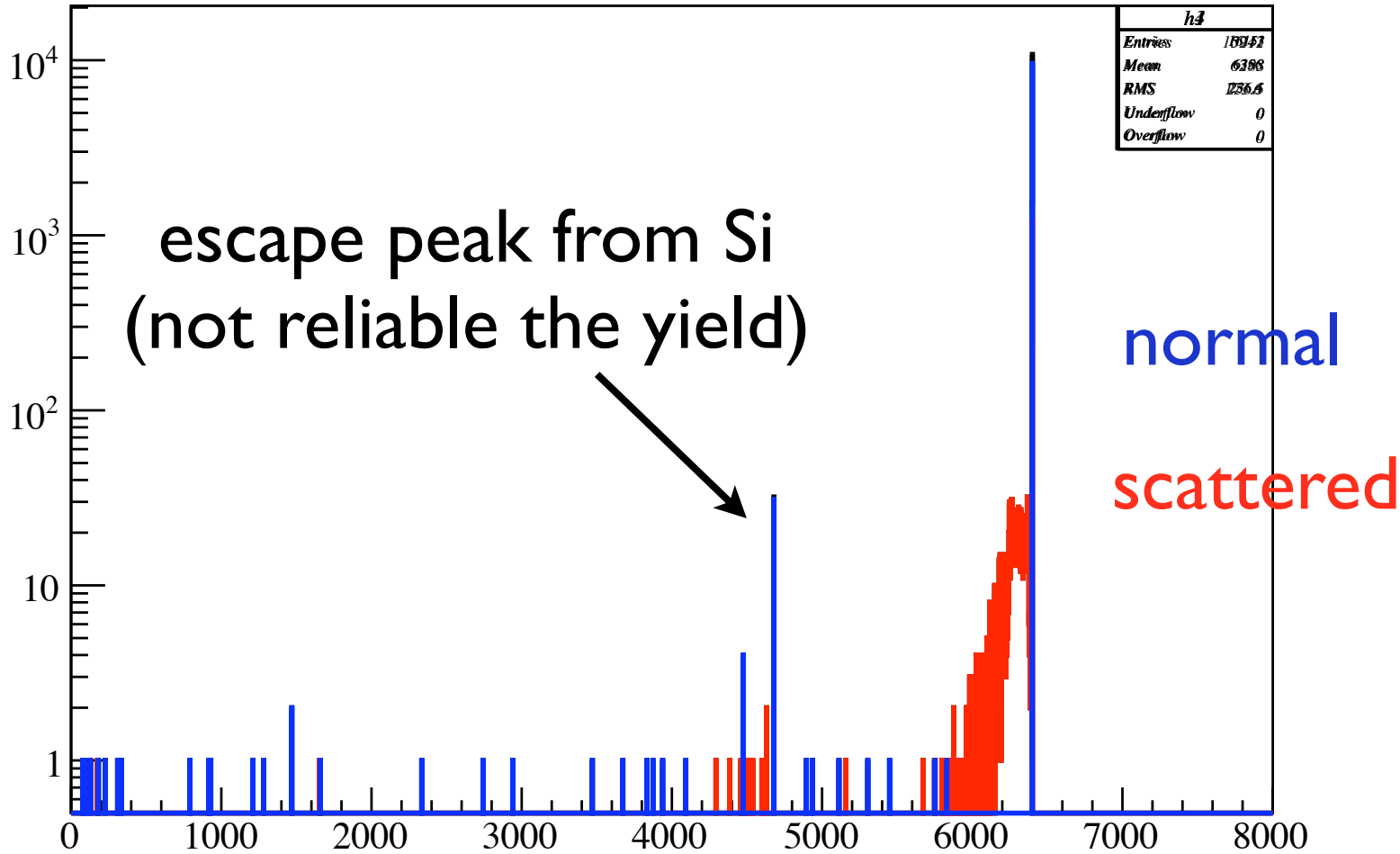
  Include Doppler broadening of a Compton scattered photon

  Improvement Rayleigh scattering

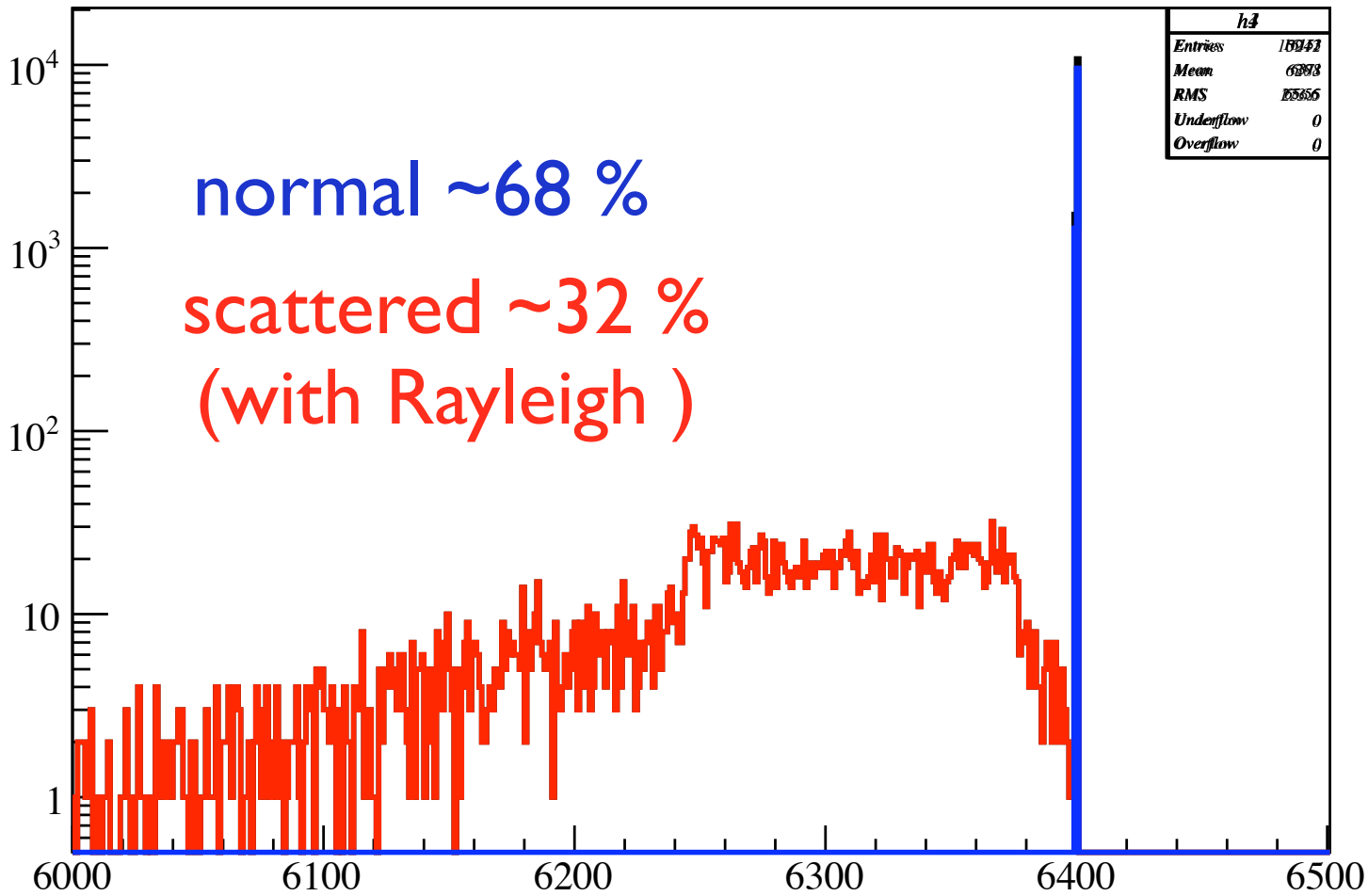
In-coherent cross section of helium-4 atom



E570 setup
realistic Kstop distribution
Monte Carlo truth (6400 eV photon)

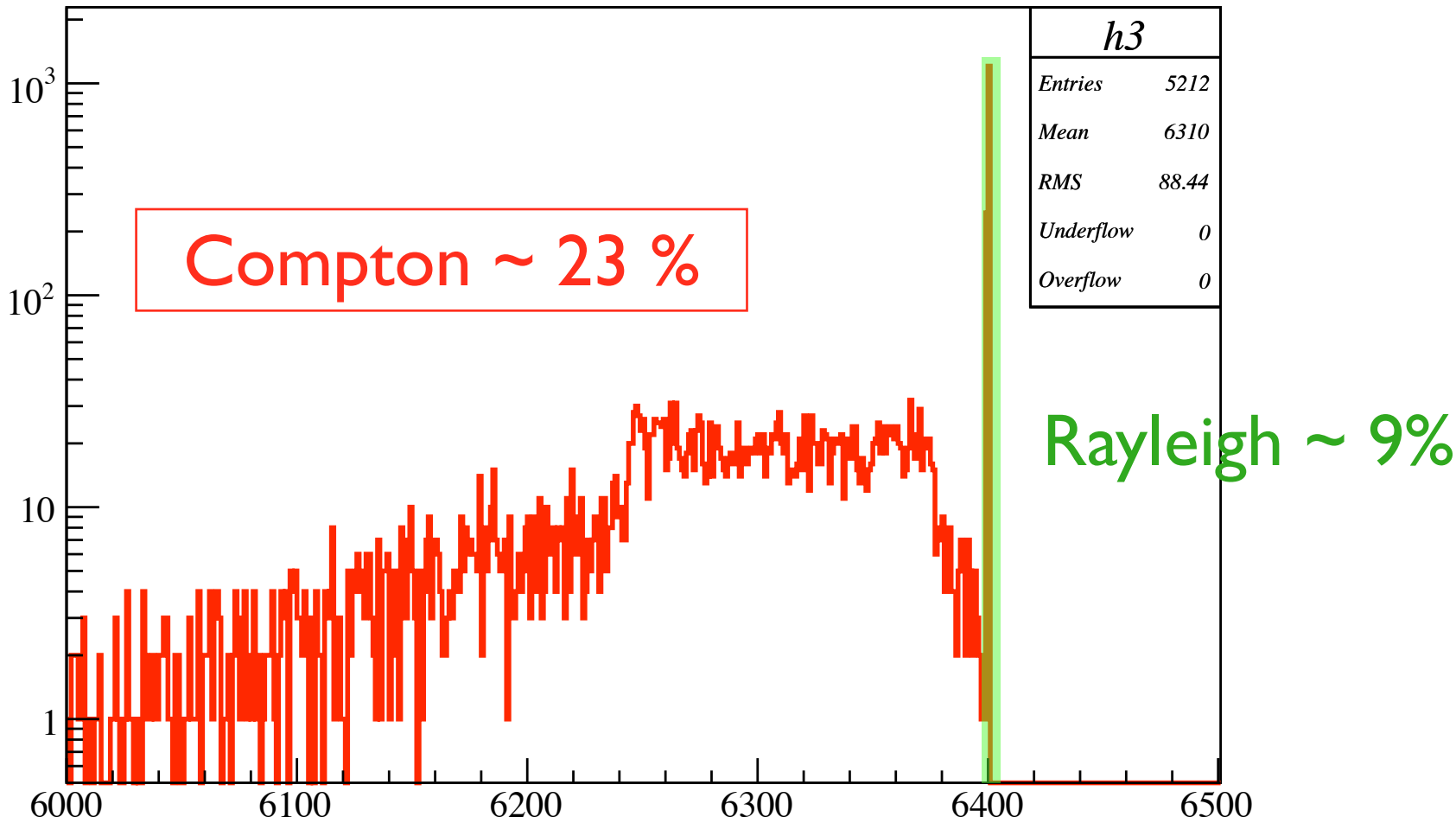


close-up



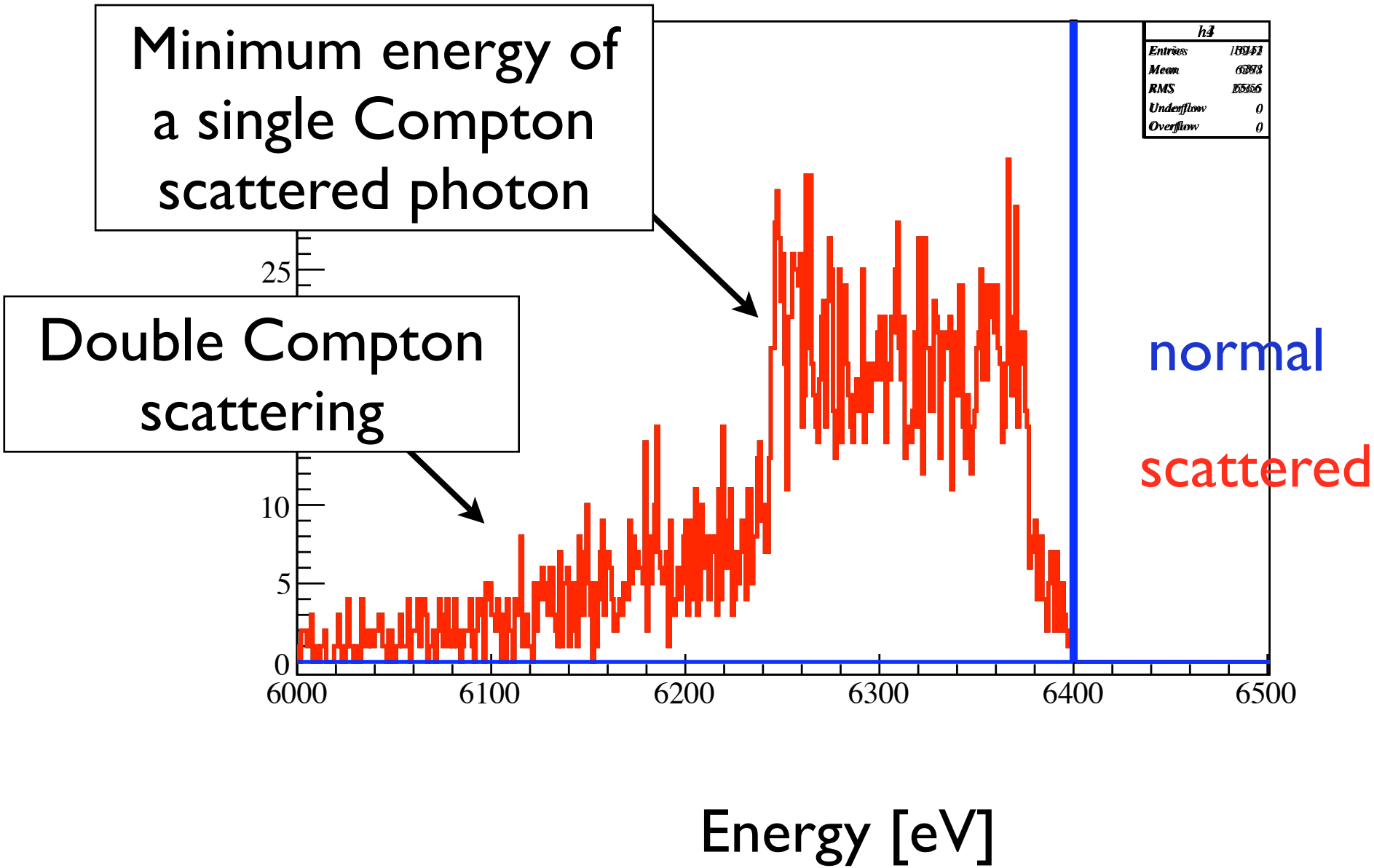
Energy [eV]

scattered ~32 %
(with Rayleigh)

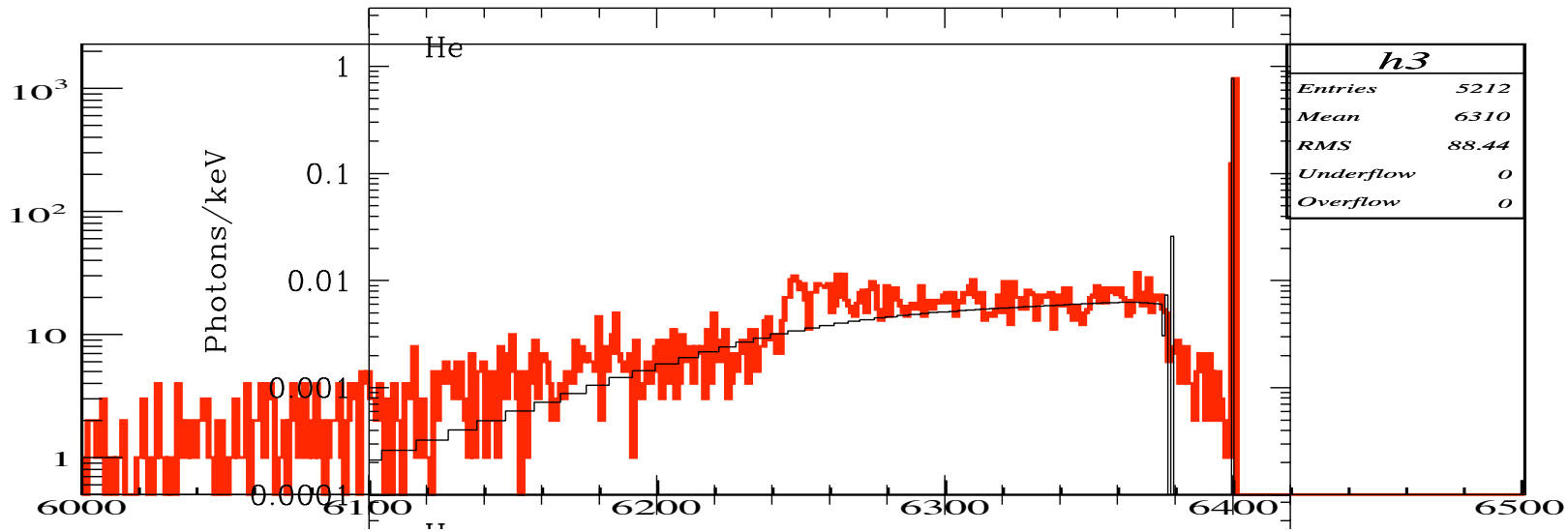


Energy [eV]

close-up linear scale



Superimposed other simulation

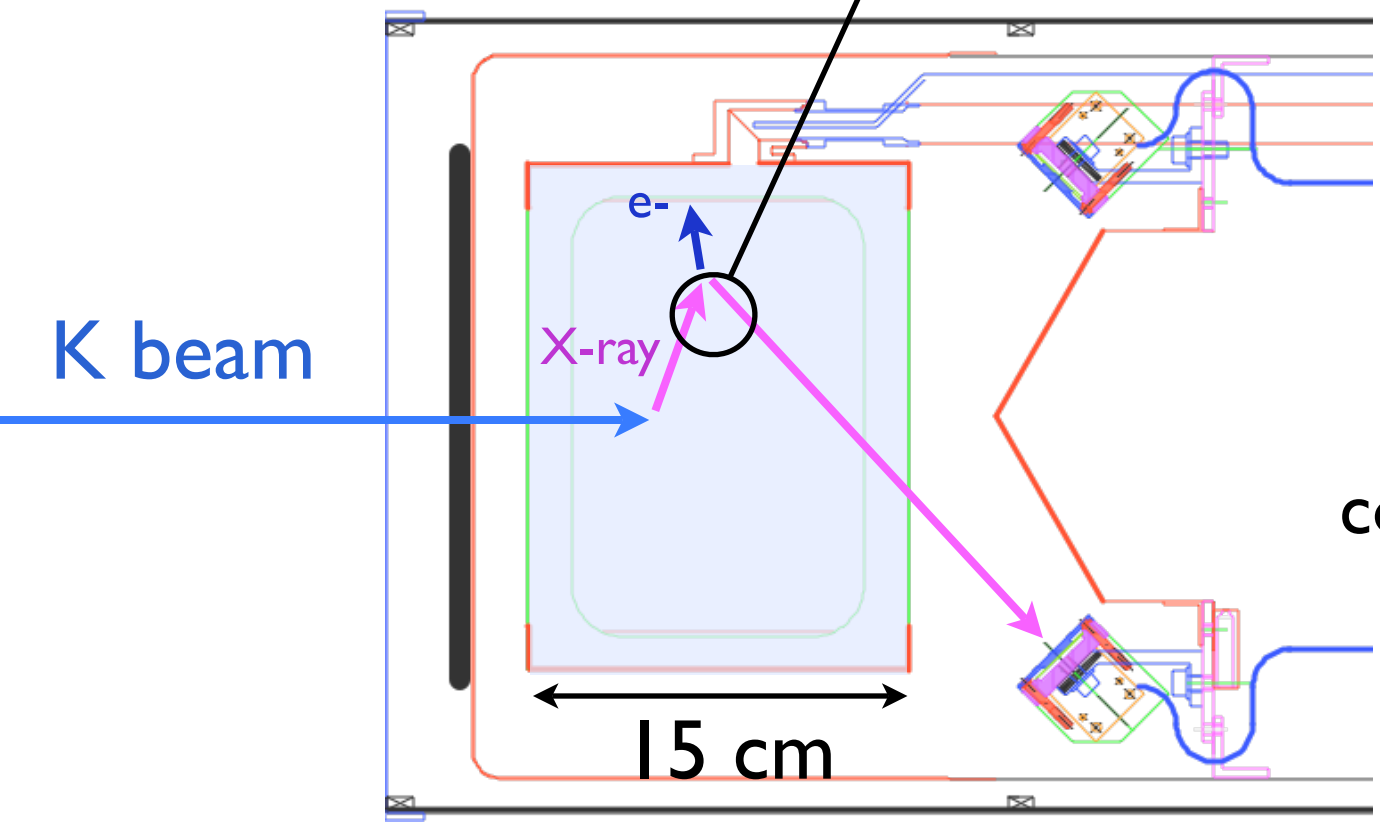


arXiv:astro-ph/9801202 v1 21 Jan 1998

Scattering of X-ray emission lines by a helium atom

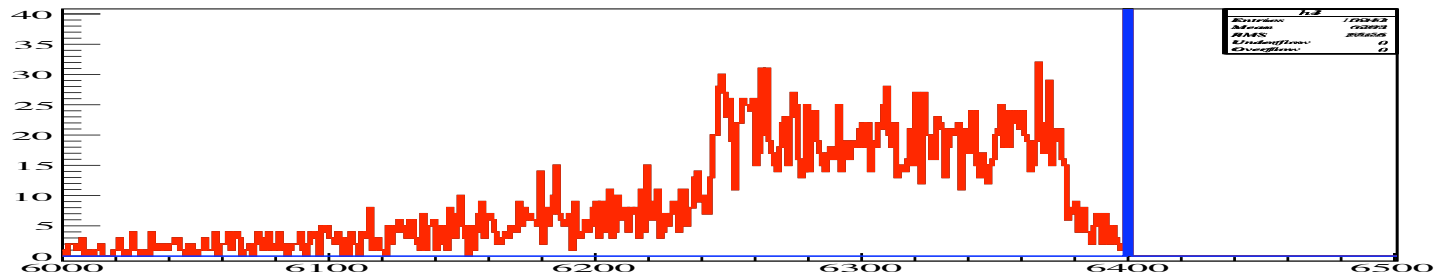
L.Vainshtein[1,2], R.Sunyaev[2,3], E.Churazov[2,3]
[1] P.N. Lebedev Physical Institute, Moscow, Russia
[2] MPI fur Astrophysik, Karl-Schwarzschild-Strasse 1, 85740 Garching, Germany
[3] Space Research Institute (IKI), Profsouznaya 84/32, Moscow 117810, Russia

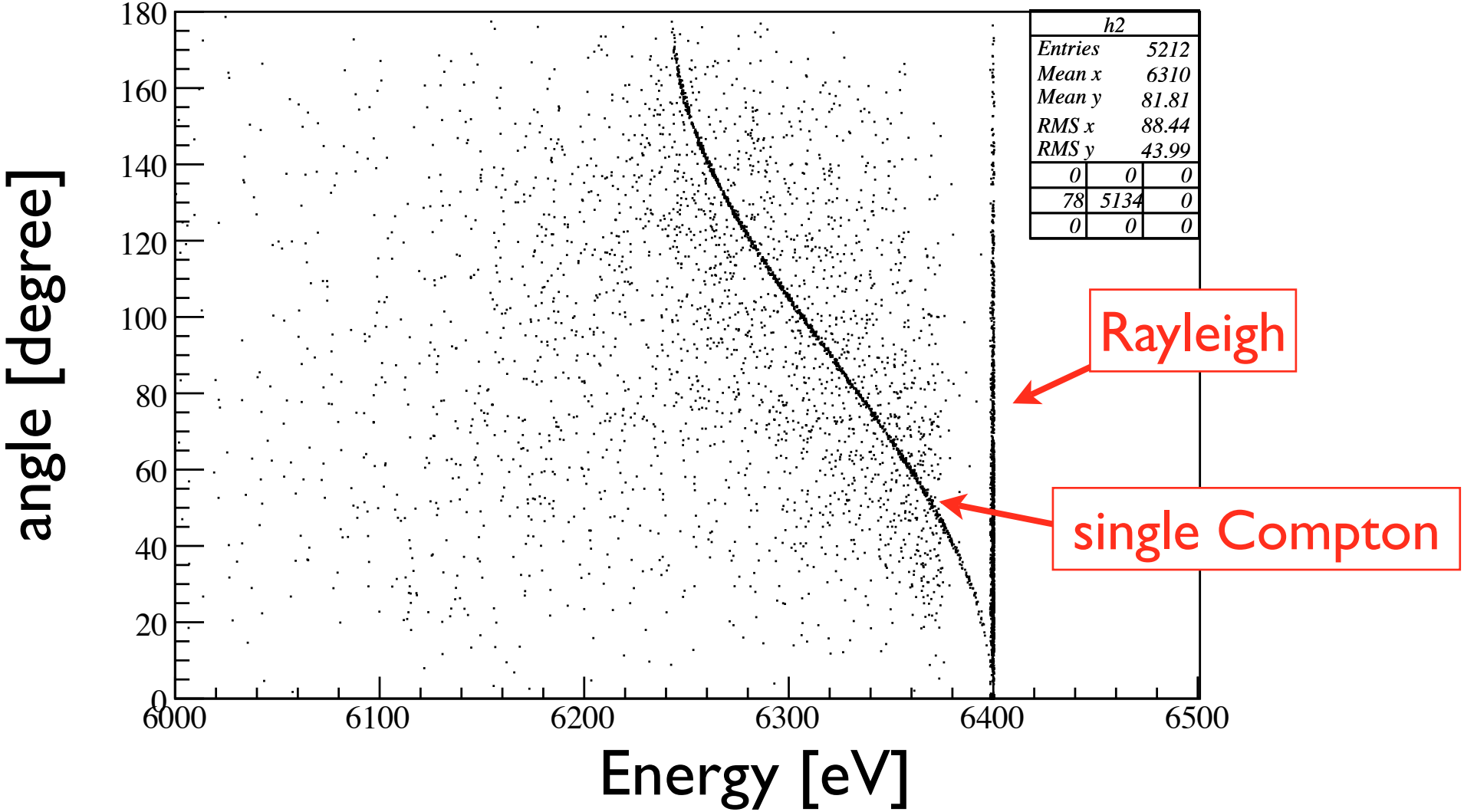
Compton scattering angle is defined as
the angle between a generated photon momentum
and the detected photon momentum.



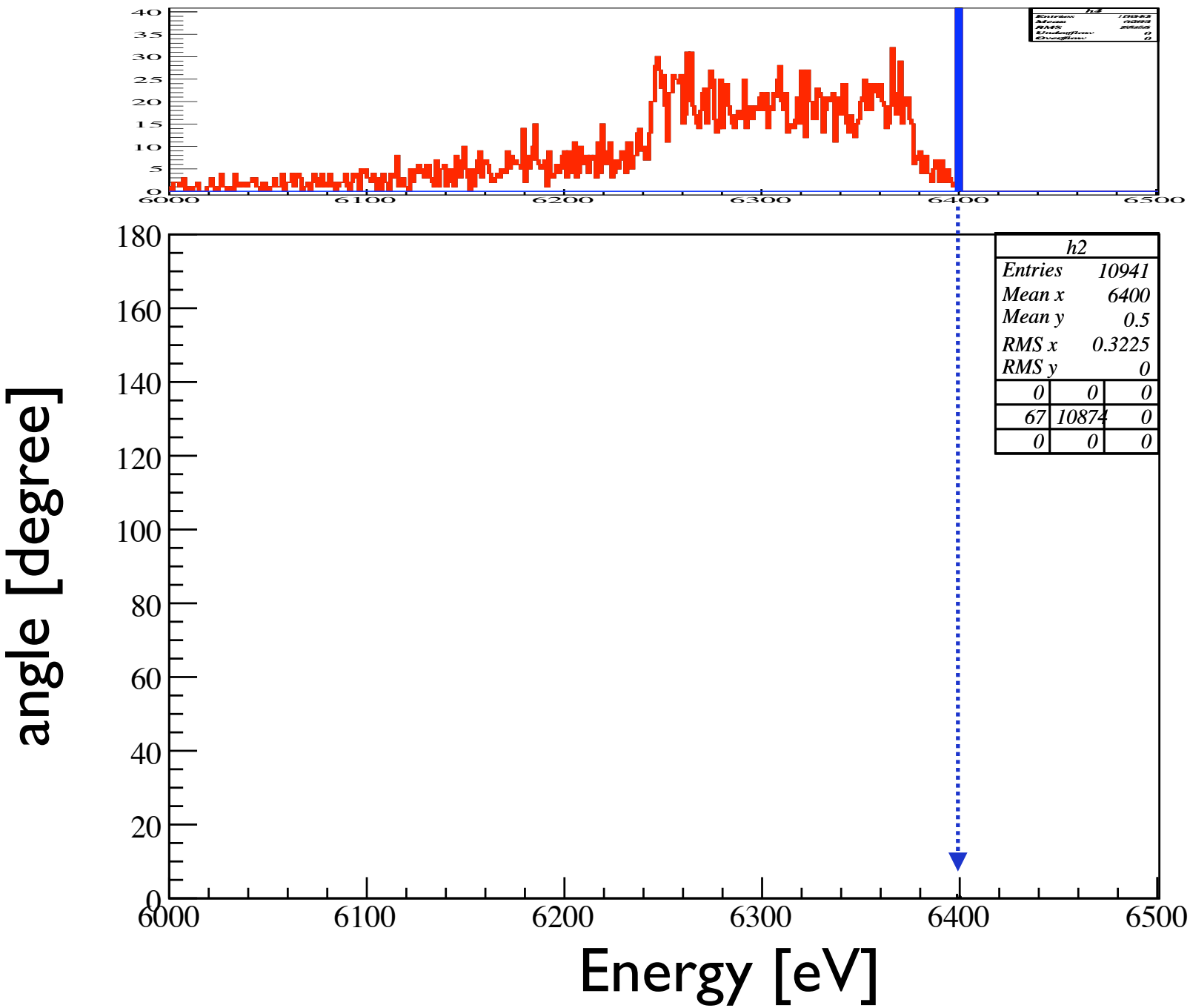
Double Compton
scattering is not
considered in the angle.

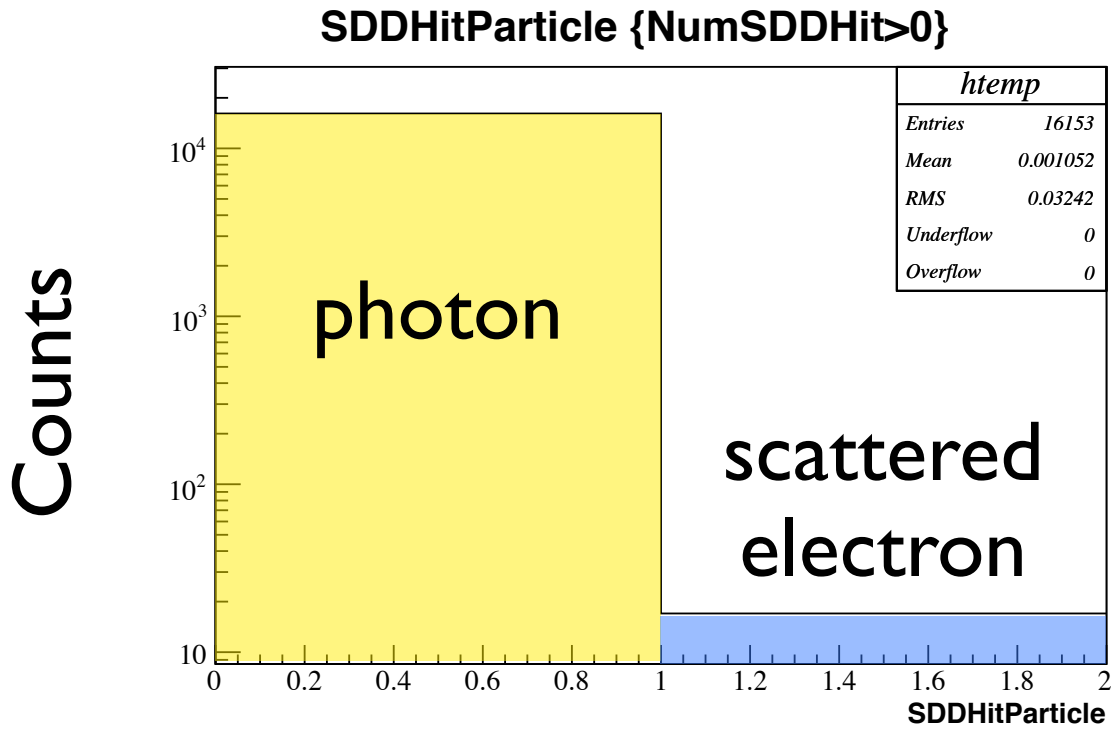
For scattered photons (at least once)



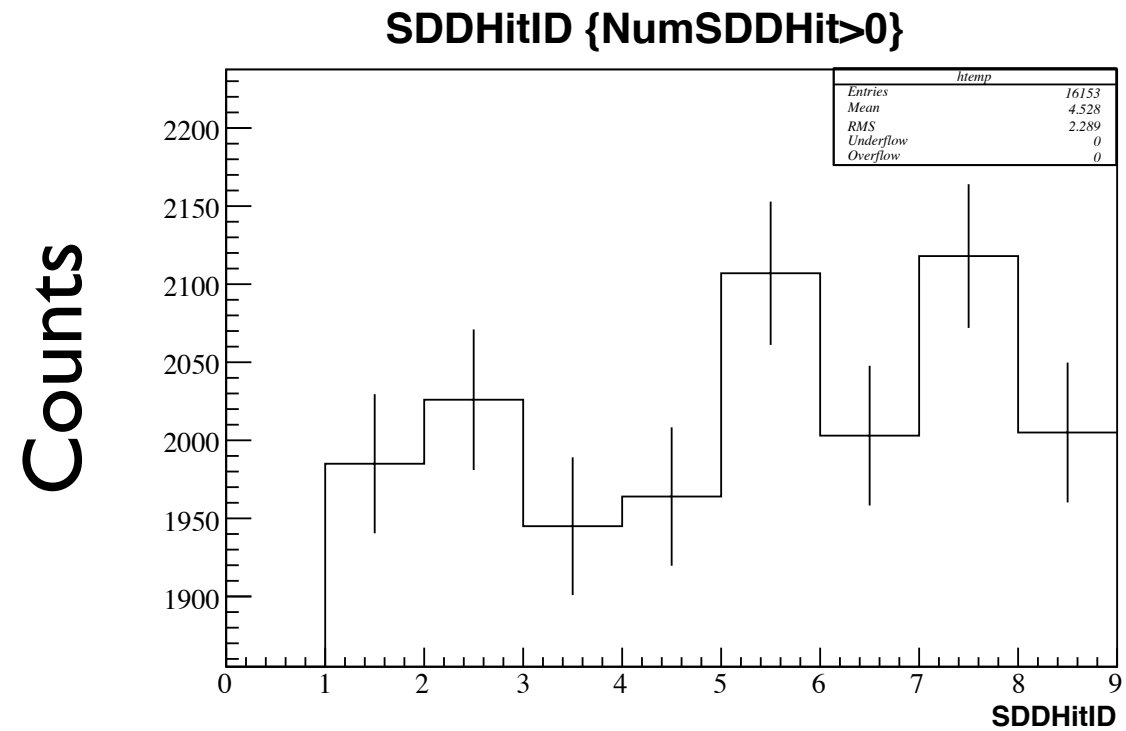


For not scattered photons





Just a little scattered electrons hit SDDs



acceptance (geometry + EM interaction)

2G photons were generated