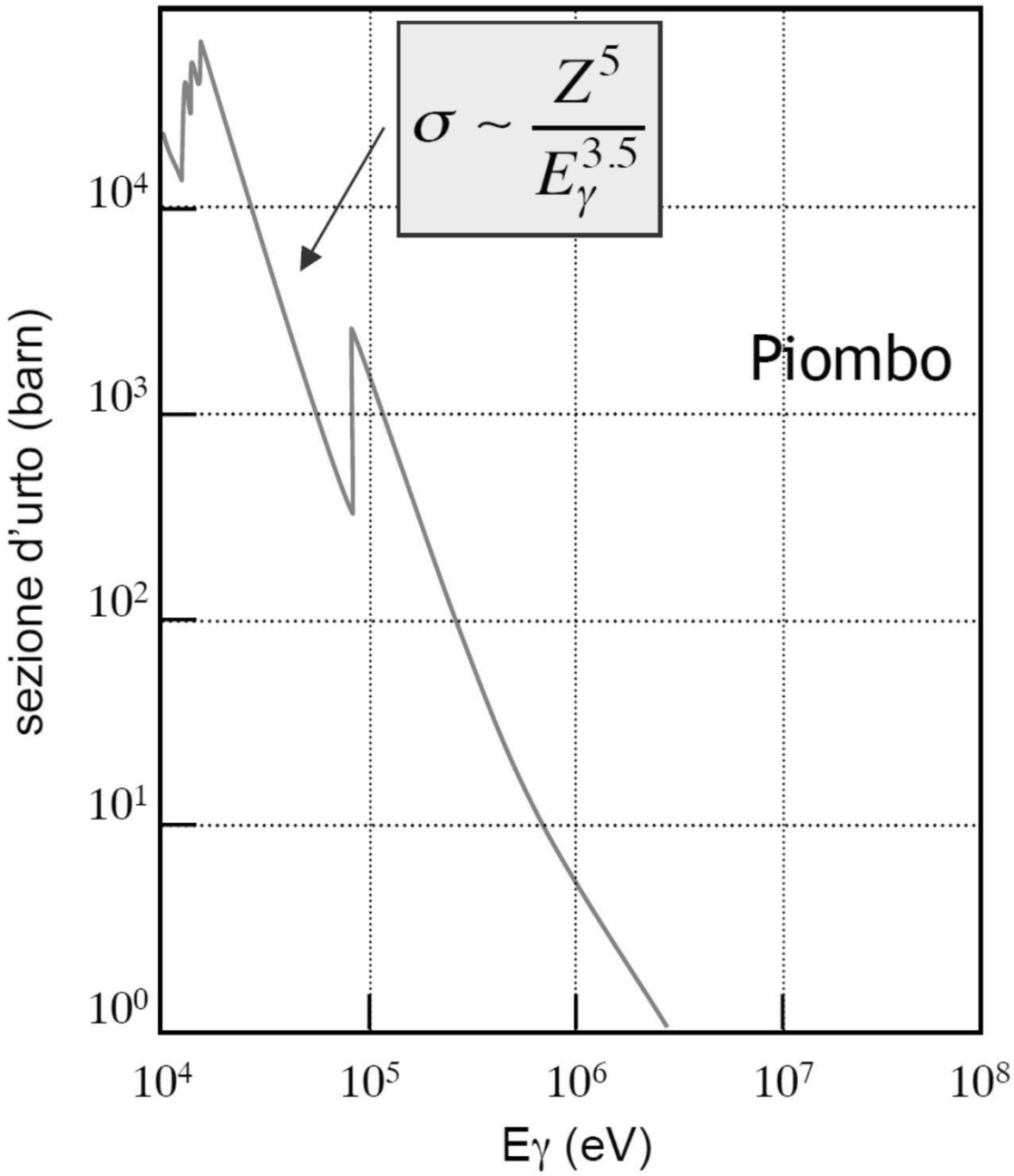
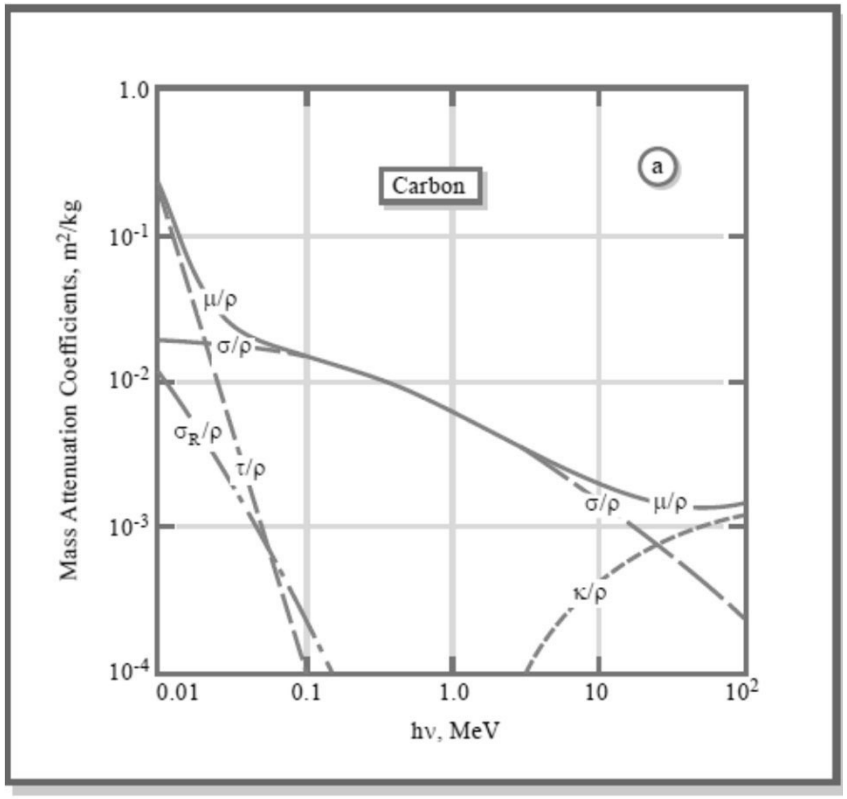
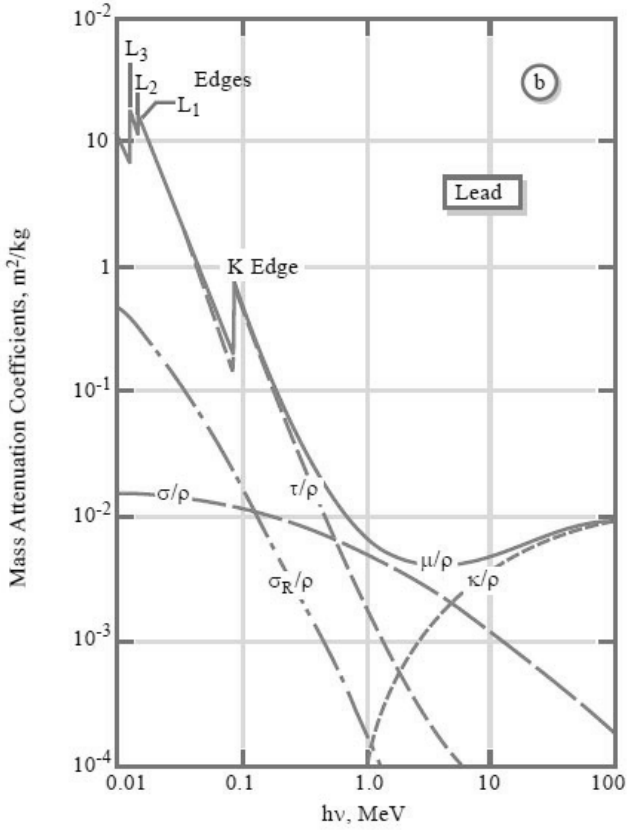
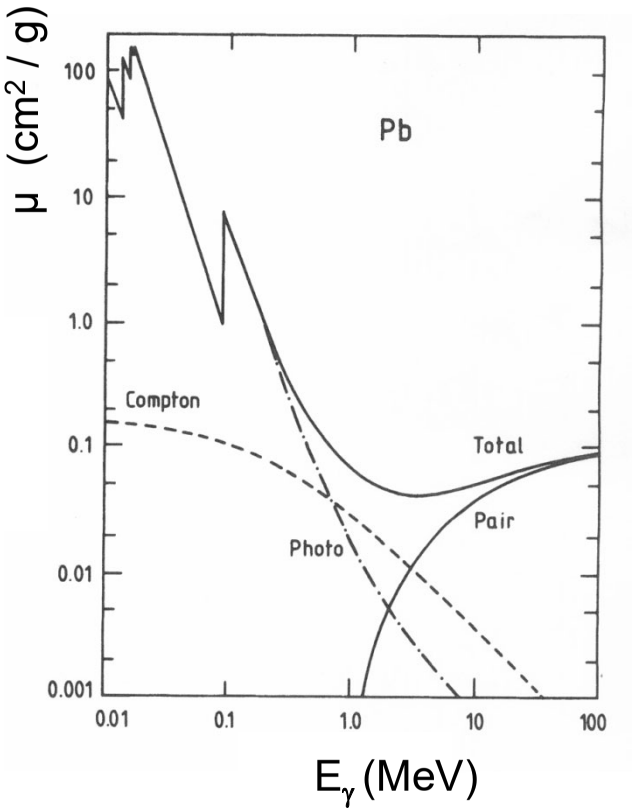
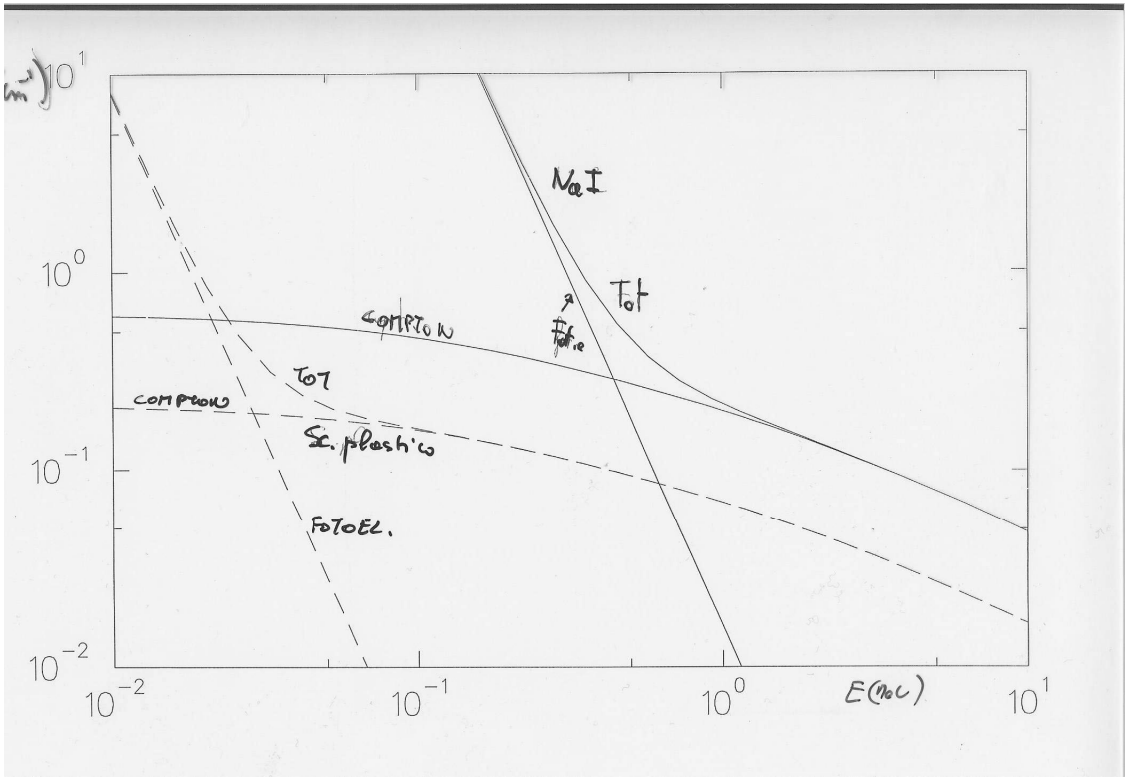

$\sigma \sim \frac{Z^5}{E_\gamma^{3.5}}$
Piombo
sezione d'urto (barn)
10^4
10^3
10^2
10^1
10^0
10^4
10^5
10^6
10^7
10^8
Eγ (eV)

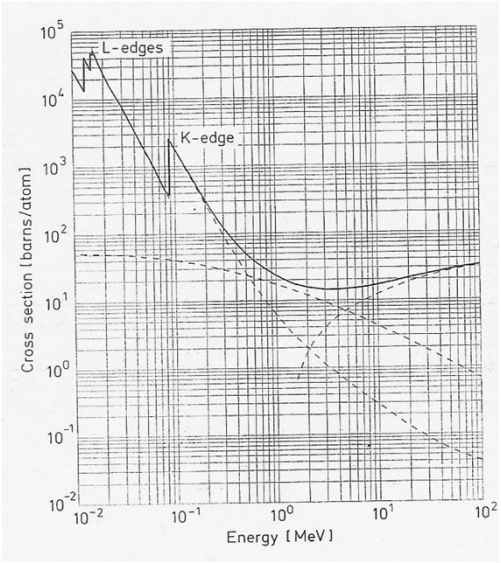




Mass attenuation coefficients for carbon (a) and lead (b). τ/ρ indicates the contribution of the photoelectric effect, σ/ρ is that of the Compton effect, κ/ρ that of pair production, and σ_R/ρ that of Rayleigh (coherent) scattering. μ/ρ is their sum, which is closely approximated in Pb by the τ/ρ curve below $h\nu = 0.1$ MeV.


μ (cm² / g)
Pb
Compton
Total
Pair
Photo
100
10
1.0
0.1
0.01
0.001
0.01
0.1
1.0
10
100
Eγ (MeV)


NaI
Tot
COMPTON
Tot
COMPTON
Sc. plastico
FOTOEL.
E(MeV)


L-edges
K-edge
Cross section [barns/atom]
Energy [MeV]

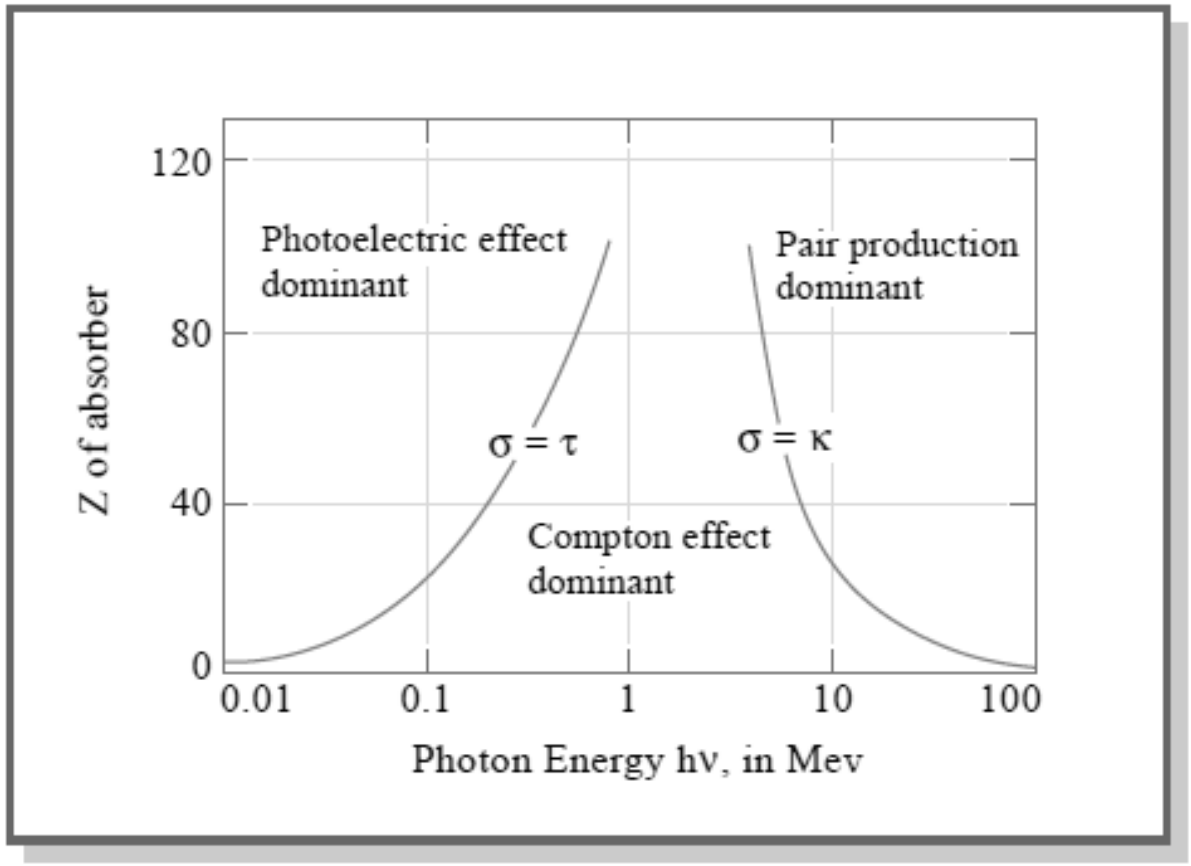
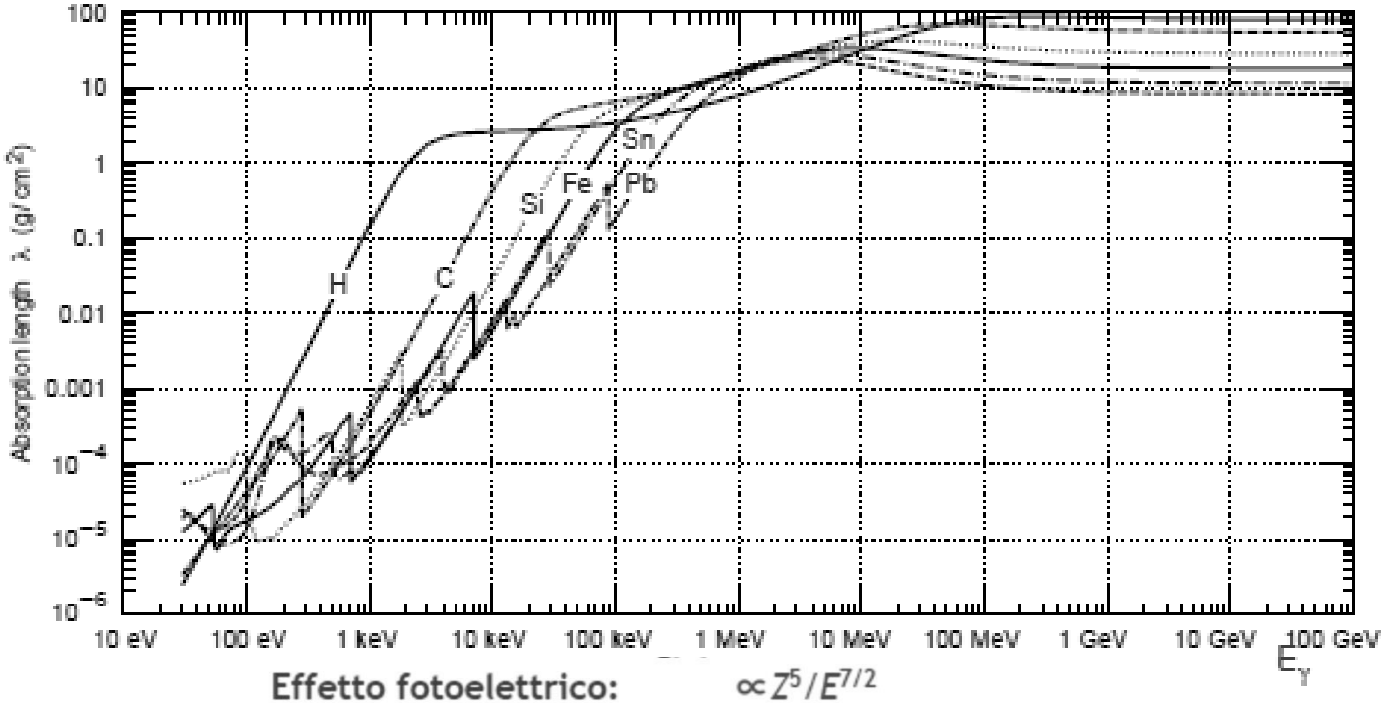


Figure by MIT OCW.

Photon Absorption Length λ

Definition of mass absorption coefficient: $\lambda = \frac{1}{(\mu/\rho)}\ [\mathrm{g\ cm^{-2}}]$

$\sigma_{Ph} \propto \frac{Z^5}{E^{3.5}}$ $\sigma_{Compton} \propto \frac{\ln E}{E} \cdot Z$ $\sigma_{Pair} \propto Z^2$



Effetto fotoelettrico: $\propto Z^5/E^{7/2}$

Effetto Compton $\propto Z/E$

Produzione di coppie: su nucleo $\propto Z^2$
su elettroni $\propto Z$