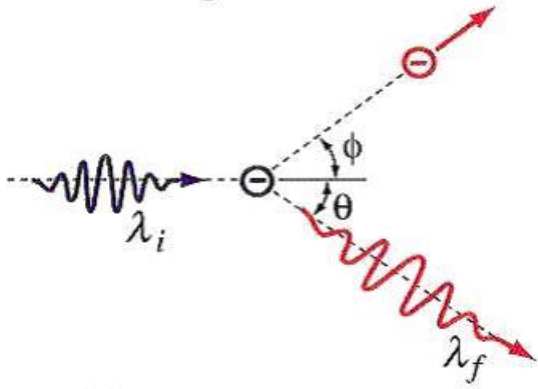


# Gamma rays

## Preparatory questions

1. Describe how a scintillation counter works, starting from the entrance of an energetic charged particle into a scintillator, and ending with an electrical pulse at the output of the photomultiplier.
2. Sketch and explain the principal features of the pulse-height spectrum obtained from a NaI scintillation counter irradiated with 0.5MeV gamma ray (see for example Melissinos and Napolitano, Experiments in Modern Physics). Give the MeV values for the line in the spectrum and for the Compton edge.
3. The Compton effect describes the scattering between a photon and electron. Using conservation of energy and momentum derive the formula for Compton scattering:  $\Delta\lambda = \frac{h}{mc} (1 - \cos \theta)$ . Does the energy of the recoiling electron depend on the energy of the incoming photon ?

### Compton Effect



4. Describe the function and operation of each of the following elements of the measurement apparatus: scaler; single channel analyzer; multichannel analyzer.