Gamma Detection

Gamma Camera

- Head
- Collimator
- "# pulses"
- "FWHM"
- "Pulse height"

Solid state detectors = better resolution = narrower peak

Si, Ge, Germanium detectors

1.1 eV
0.6 eV

Width of energy gap

n-type (negative charge⇒ extra electron) = negative charge carriers are moving
p-type (positive charge⇒ hole) = positive charge carriers are moving

Conduction band
Energy band
Valence band

Problem with Si?

- Interaction α+ Z, Si has a Z of only 14
- Be has a Z of 9, but band gap is so small that it cannot be used @ room temperature ⇒ liquid N₂ cooling
- Lithium-doped Germanium (GeLi) = had to be cooled 24/7
- High Purity Germanium (HPGe) = no lithium, only needs to be cooled when in use

* Too expensive for common use in medical applications

NaI: 7x more efficient
HPGe: Much higher resolution = narrower peaks