8.3 Particle Induced Radiation

Observable Photons in HPGe detector pulse height distributions induced by neutrons (muons, photons, ...) through primary neutron sources or secondary neutrons from cosmic rays produced in commonly used shielding, mounting and detector materials.

8.3.1 Neutron Scattering

Decay of excited states (level: 1., 2., ...) to ground state (0.)

isotope	levels: 0., 1., .. IT ($t_{1/2}$)	γ-ray transitions (cascade) to final level E_γ keV	**inelastic fast n-scattering** remarks (Ge recoil)	isotopic abundance %
$^{207}_{82}$**Pb**	1.-exc. to 0. 2.-exc. to 0. IT (805ms)	$\rightarrow \gamma:$ 569.702^{E2} $\rightarrow \gamma:$ 897.80^{E2} $\rightarrow \gamma:$ 1063.662^{M4,E5}, 569.702	$(n,n'\gamma)$ $(n,n'\gamma)$ $(n,n'\gamma)$	22.1
$^{206}_{82}$**Pb**	1.-exc. to 0. 3.-exc. to 1.	$\rightarrow \gamma:$ 803.10^{E2} $\rightarrow \gamma:$ 537.45^{M1,E2}, ...	$(n,n'\gamma)$ $(n,n'\gamma)$	24.1
$^{76}_{32}$**Ge**	1.-exc. to 0. 2.-exc. to 1.	$\rightarrow \gamma:$ 562.93^{E2} $\rightarrow \gamma:$ 545.51^{E2,M1}, ...	asym. peak $(n,n'\gamma)$ $(n,n'\gamma)$	7.44
$^{74}_{32}$**Ge**	1.-exc. to 0. 2.-exc. to 1.	$\rightarrow \gamma:$ 595.847^{E2} $\rightarrow \gamma:$ 608.353^{E2,M1}, ...	asym. peak $(n,n'\gamma)$ $(n,n'\gamma)$	35.94
$^{72}_{32}$**Ge**	1.-exc. to 0. 2.-exc. to 0. int=	$\rightarrow \gamma:$ 689.6^{E0} (conversion electron) $\rightarrow \gamma:$ 834.01^{int,E2} ^{54}Mn(834.85)	asym. peak $(n,n'e^-)$ $(n,n'\gamma)$	27.66
$^{65}_{29}$**Cu**	1.-exc. to 0. 2.-exc. to 0. 3.-exc. to 0.	$\rightarrow \gamma:$ 770.66^{M1,E2} $\rightarrow \gamma:$ 1115.546^{M1,E2} $\rightarrow \gamma:$ 1481.84^{M1,E2}	$(n,n'\gamma)$ $(n,n'\gamma)$ $(n,n'\gamma)$	30.83
$^{63}_{29}$**Cu**	1.-exc. to 0. 2.-exc. to 0. 3.-exc. to 0. 4.-exc. to 0. 5.-exc. to 0.	$\rightarrow \gamma:$ 669.62^{M1,E2} $\rightarrow \gamma:$ 962.06^{M1,E2} $\rightarrow \gamma:$ 1327.03^{E2} $\rightarrow \gamma:$ 1412.08^{M1,E2} $\rightarrow \gamma:$ 1547.04^{M1,E2}	$(n,n'\gamma)$ $(n,n'\gamma)$ $(n,n'\gamma)$ $(n,n'\gamma)$ $(n,n'\gamma)$	69.17
$^{56}_{26}$**Fe**	1.-exc. to 0. 2.-exc. to 1.	$\rightarrow \gamma:$ 846.771^{E2} $\rightarrow \gamma:$ 1238.282^{E2}, ...	$(n,n'\gamma)$ $(n,n'\gamma)$	91.72
$^{27}_{13}$**Al**	1.-exc. to 0. 2.-exc. to 0.	$\rightarrow \gamma:$ 843.74^{E2} $\rightarrow \gamma:$ 1014.42^{M1,E2}	$(n,n'\gamma)$ $(n,n'\gamma)$	100
$^{19}_{9}$**F**	1.-exc. to 0. 2.-exc. to 0.	$\rightarrow \gamma:$ 109.894^{E1} $\rightarrow \gamma:$ 197.142^{E2}	$(n,n'\gamma)$ $(n,n'\gamma)$	100