- Significant probability for neutrons to interact with Ge-shell the size of Agata, about 50% with 5 keV threshold.
- Attempts to discriminate between neutrons and γs using PSA not yet successful.
- Further attempts will however be made, trying to first divide pulse shapes into classes based on radial interaction point in a coaxial detector, and then looking at the more subtle effects of the process that generates the charge carriers.

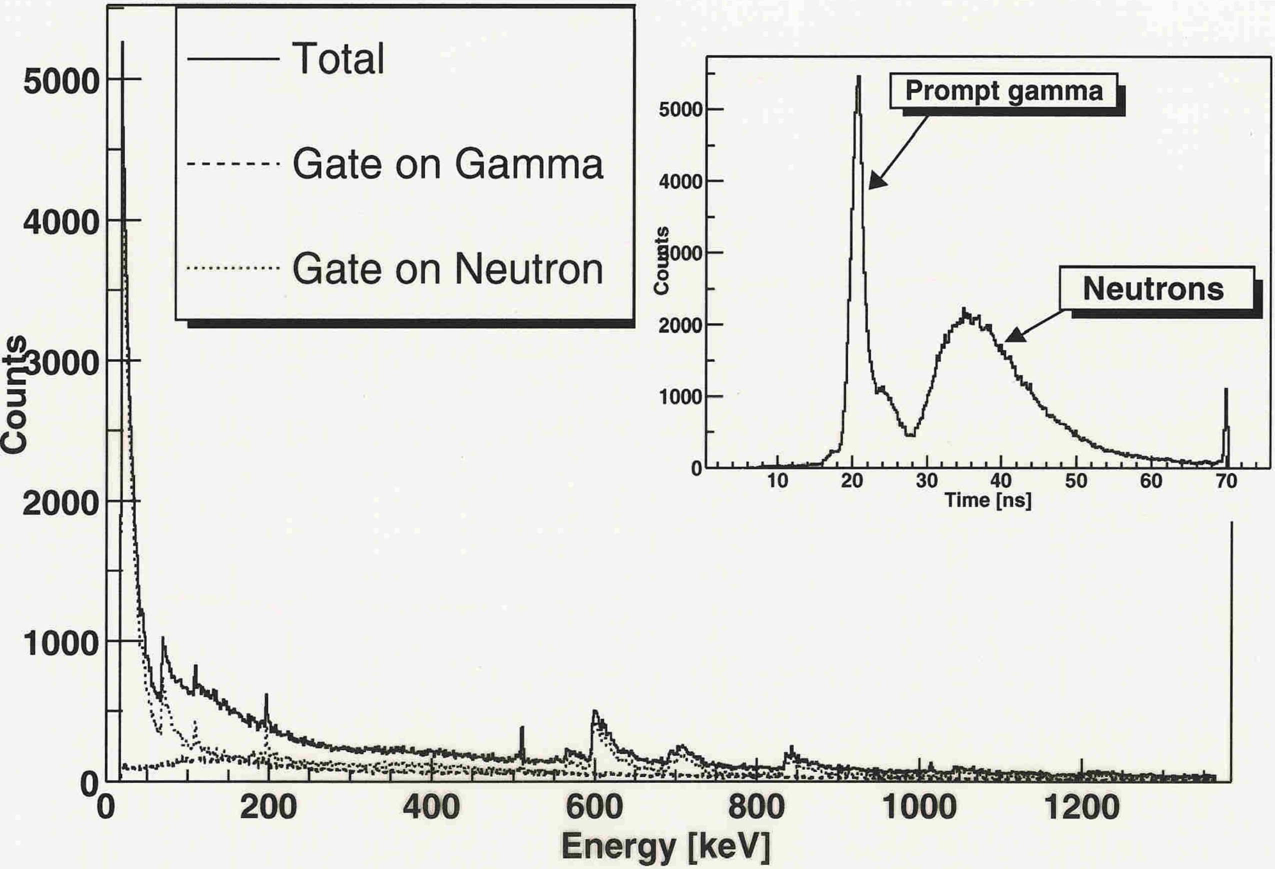


Figure 3: Spectra from Ge detector radiated by ^{252}Cf.

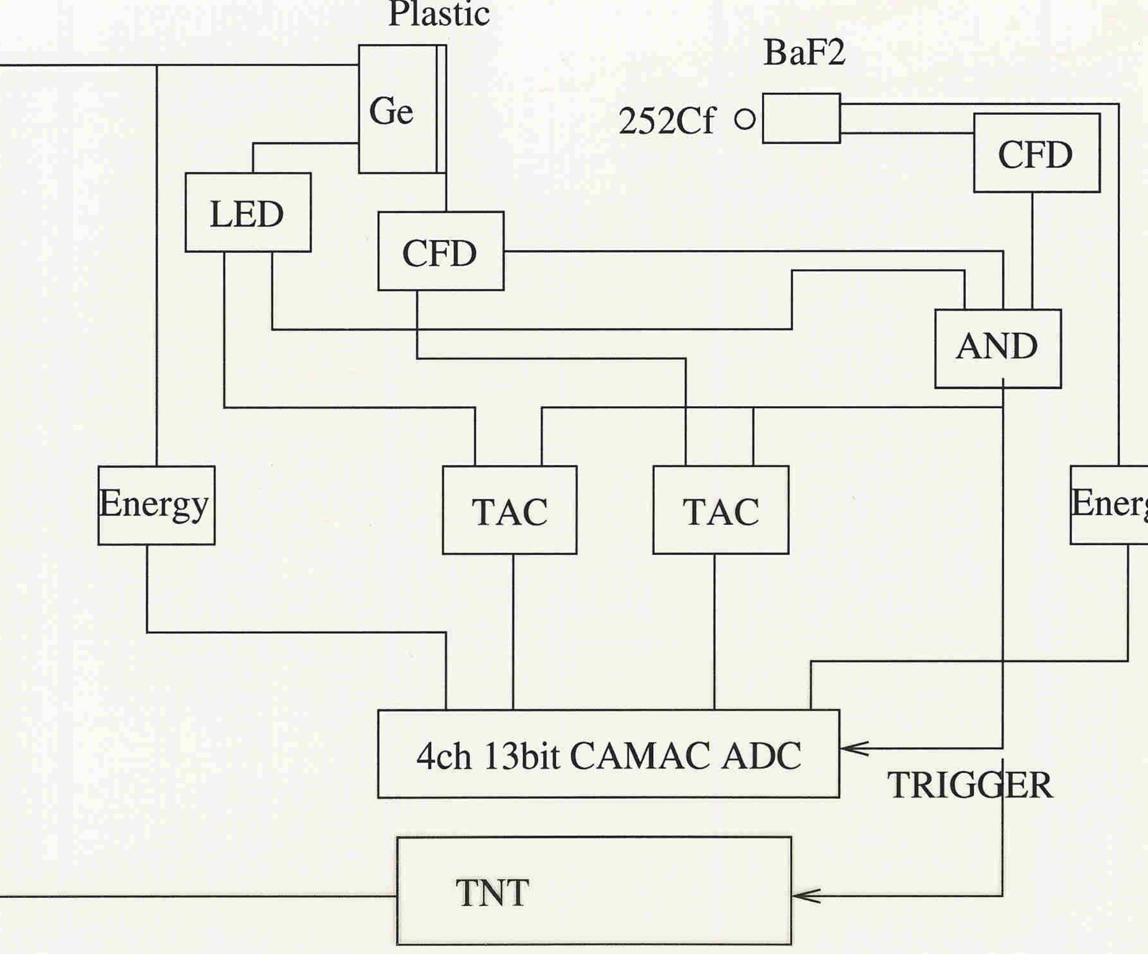


Figure 2: The experiment setup.

- Different energy deposition mechanisms, γ interacts with an electron, neutrons interact with Ge nuclei.
- Idea, dense charge carrier cloud produced by Ge nuclei “screens” e tric field, delaying charge carrier transport (compare silicon charge-particle detector). Charge carriers assumed to leave cloud by diffusion.
- Problem: small effect $\sim 10\ ns$. Bandwidth of preamplifier 25MHz, rise time of signal several hundred nanoseconds...
- Problem: deposited energy by recoil nucleus $\sim 10 - 60\ keV$, noise-dominated signals.

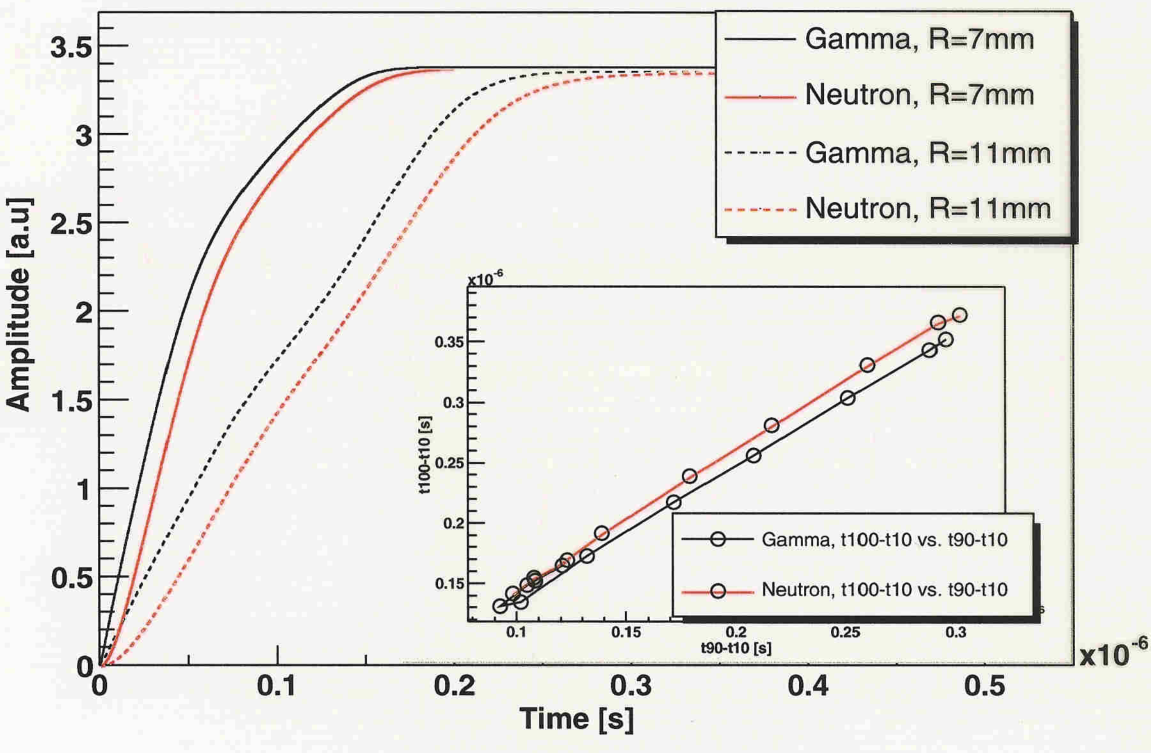
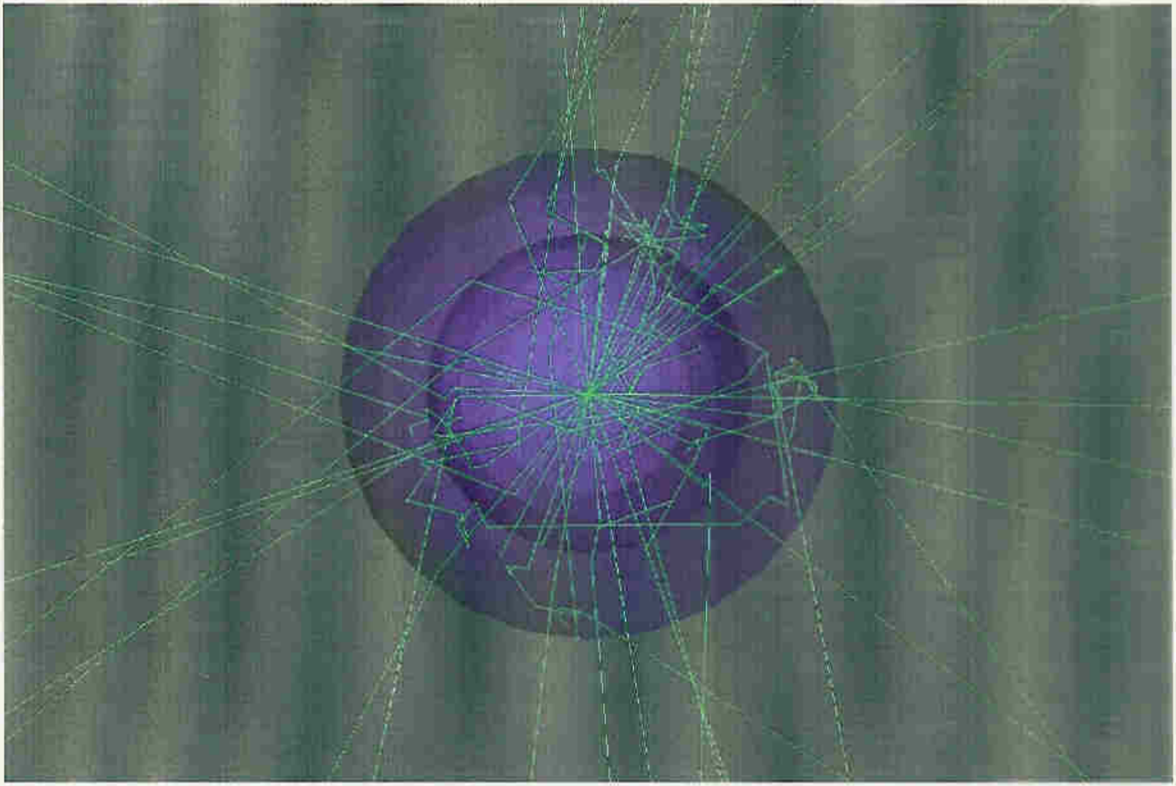


Figure 1: Calculated pulse shapes for γs and neutrons.



Threshold [keV]	#interactions/emitted neutron		efficiency [%]
	GEANT4	MCNP	GEANT4
0	2.3	2.1	65
5	1.5	-	54
10	1.1	-	45
50	0.24	-	15

Table 1: Expected efficiencies for neutrons in AGATA. GEANT4 simulation included elastic scattering and neutron capture ($\sim 90\%$ of total cross section), MCNP only elastic scattering. MCNP simulation provided by Anders Axelsson, FOI.