

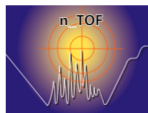
Spectroscopy with diamonds

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CIVIDEC

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cividec
instrumentation

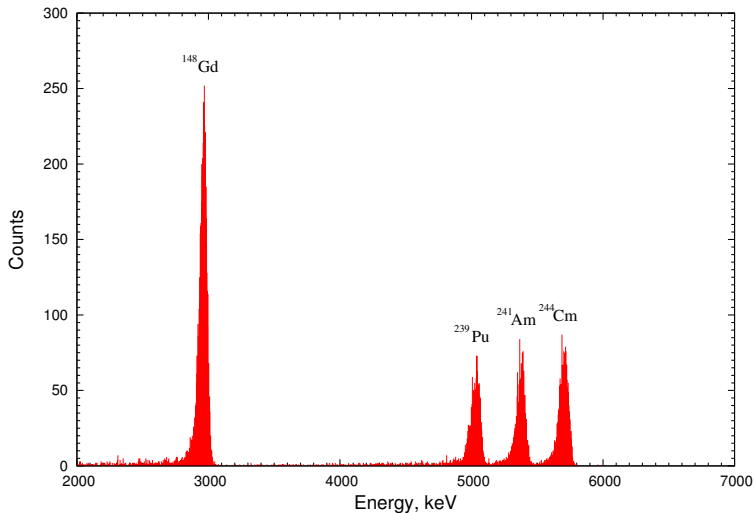


Quadruple α -source

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- ^{148}Gd , ^{239}Pu , ^{241}Am , ^{244}Cm
- CIVIDEC sCVD diamond detector
- CIVIDEC Cx amplifier

Quadruple α -source: measured spectrum



(Courtesy of E.Griesmayer and C.Weiss)

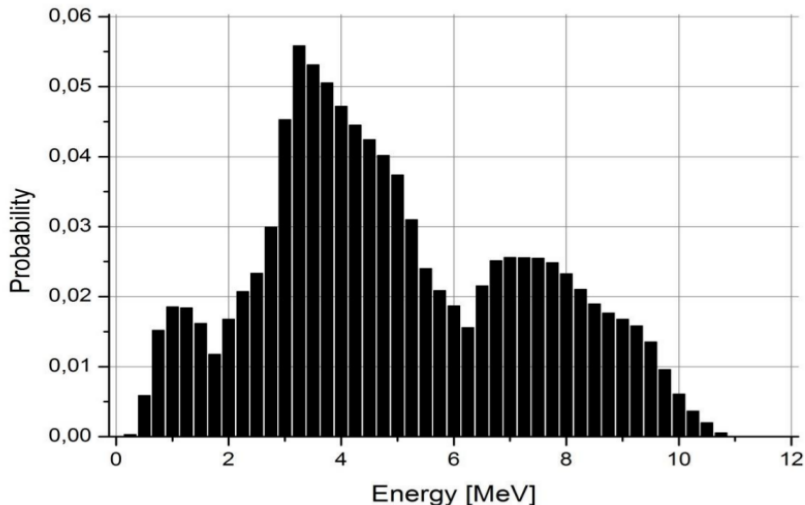
Quadruple α -source: energy resolution

Source	σ, keV
^{148}Gd	± 26
^{239}Pu	± 34
^{241}Am	± 30
^{244}Cm	± 34

Fast neutrons

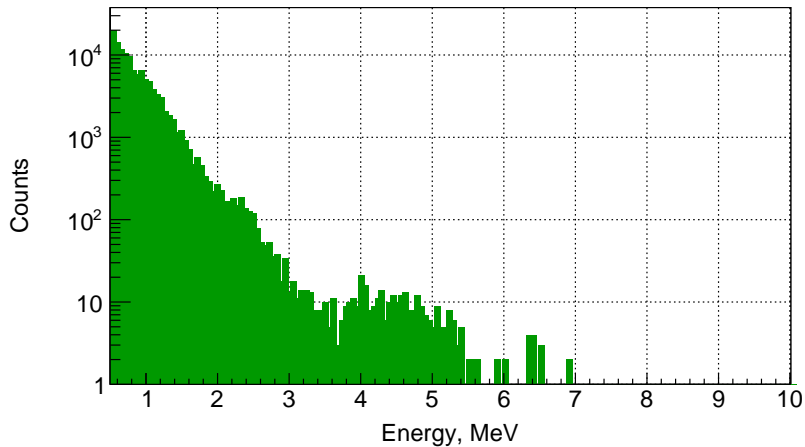
- NUMEC PuBe fast neutron source
- Strength: $8 * 10^6$ n/s
- Energy < 11 MeV
- CIVIDEC sCVD diamond detector
- CIVIDEC Cx amplifier

PuBe source: spectrum



(S.Haas, "Simulation und Konstruktion eines neuen Messplatzes für die Pu-Be Laborneutronenquelle", TU Wien, 2012)

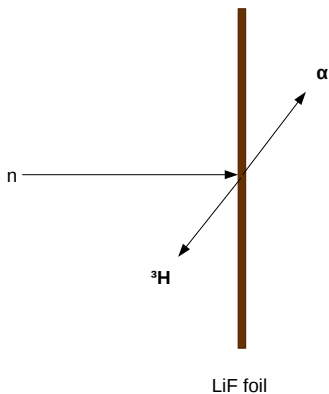
PuBe source: measurement



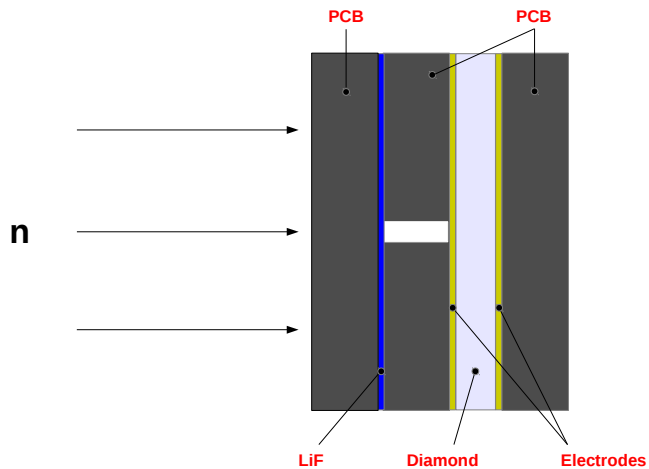
Thermal neutrons

The experiment

- TRIGA reactor (Atominstytut, Vienna)
- Monochromatic neutron beam 2.6 Å
- Neutron flux density 1000 neutrons/cm² · s
- CIVIDEC sCVD diamond detector
- CIVIDEC C2 amplifier
- ⁶LiF foil converter
- Spectroscopy of α and ³H



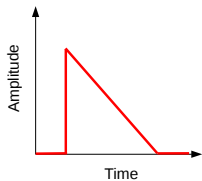
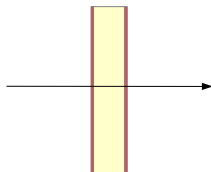
Experimental setup



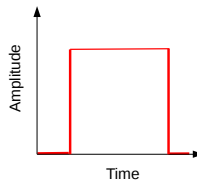
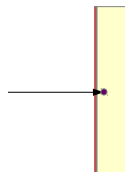
- 1 Beamline background
- 2 Neutron conversion in the detector

Pulse shape analysis

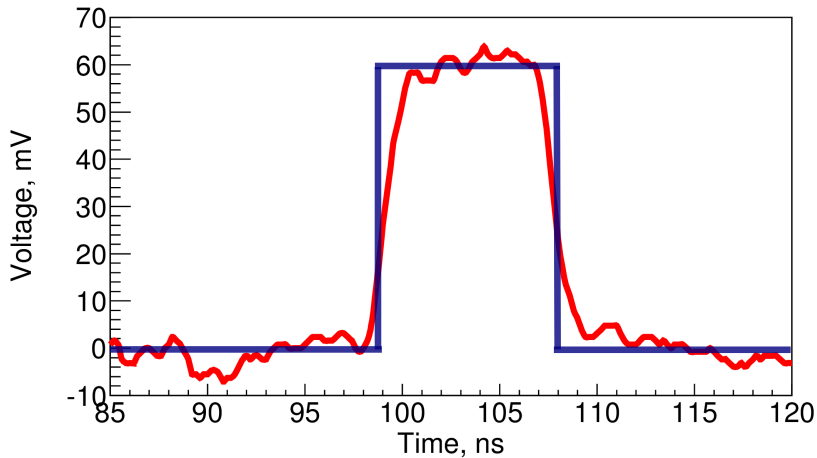
Triangular pulse shape



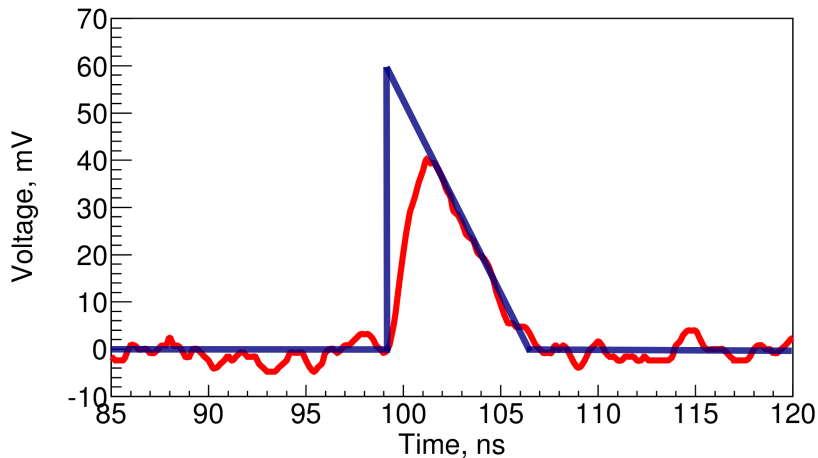
Rectangular pulse shape



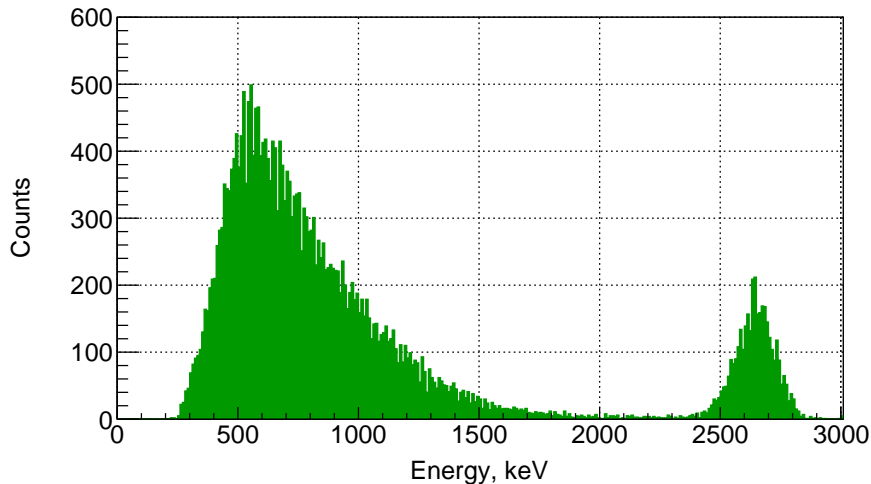
α -calibration pulse



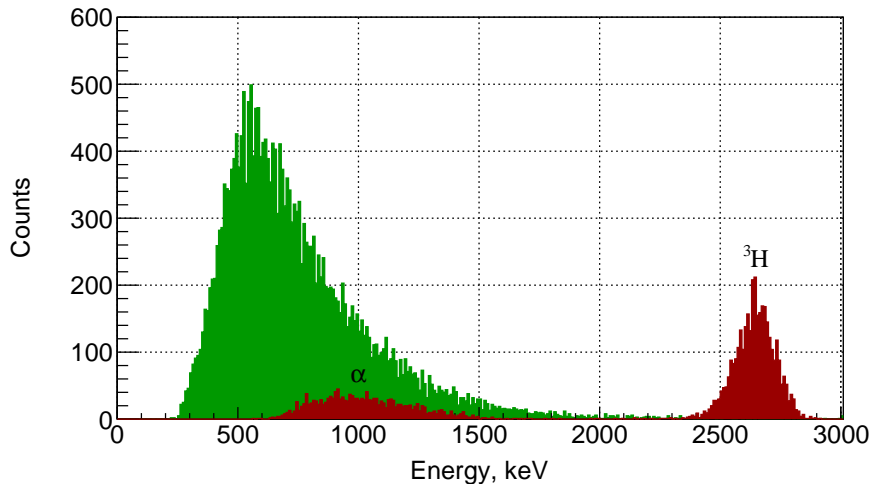
β -calibration pulse



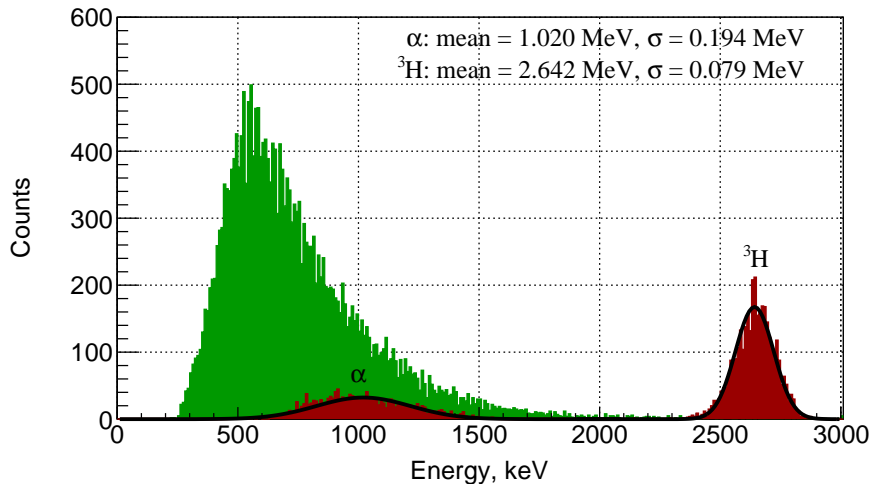
Measurement with ^6LiF foil converter



Pulse shape analysis applied to the measurement



Pulse shape analysis applied to the measurement



Energy deposited in the detector

	α	${}^3\text{H}$
Incident energy (MeV)	2.05	2.73
Expected energy (MeV)	1.40 ± 0.09	2.62 ± 0.02
Measured energy (MeV)	1.02 ± 0.19	2.64 ± 0.08

Thank you for your attention!