



Measurement of lifetime of Au198

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Outline

- **Theory**
- **Facility**
- **Result**
- **Process**



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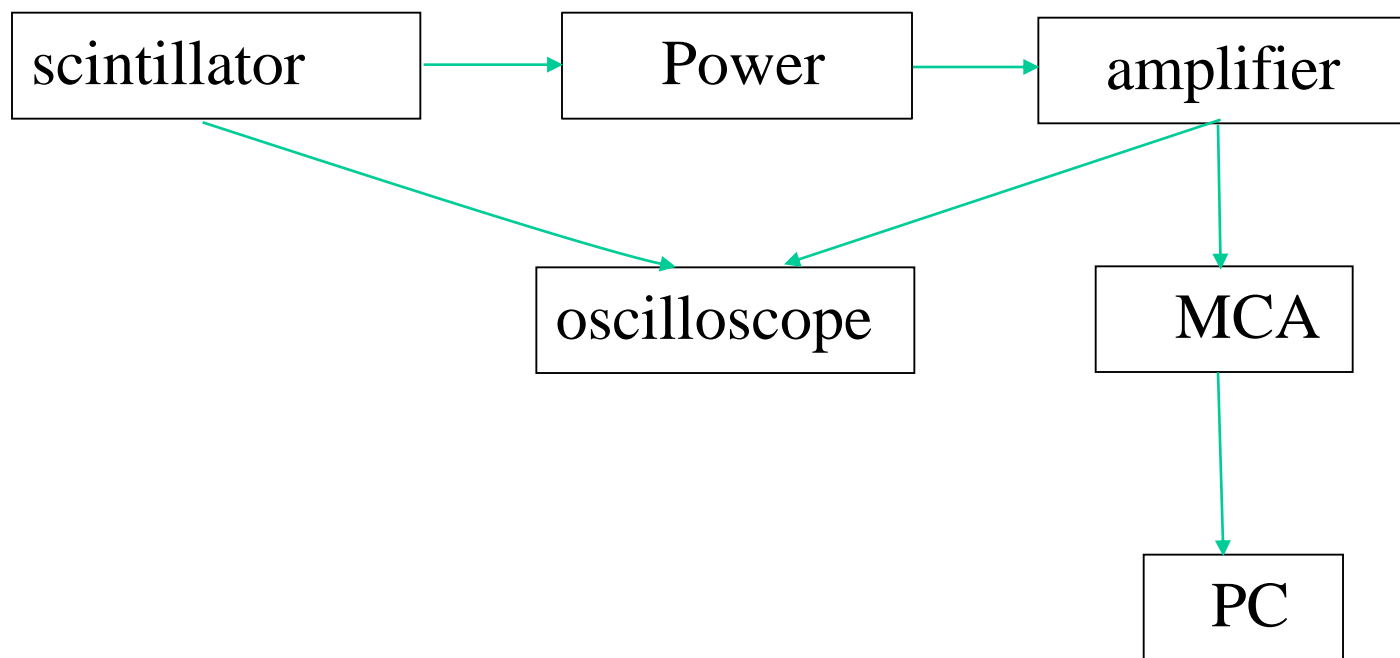
Theory

- $\text{Au197} + (\text{n}, \gamma) \rightarrow \text{Au198}$
- $\text{Au198} \rightarrow \text{Hg198}^*$
- $\text{Hg198}^* \rightarrow \text{Hg198} + \gamma \quad E_\gamma = 411 \text{keV}$
- $\text{HL} = 2.7 \text{d}$
- $N(t) = N_0 \exp(-\lambda t)$
- $T = T_{1/2} / \ln 2 = 1 / \lambda$





Facility





Result

- **1st data**
- **Time: 16:5:20→16:10:20**
- **Power: -1205v**
- **AMP:500+5.0**
- **All count: 131164**
- **Net count: 112345 (320.9—498.9keV)**
- **FWHM: 377.5—440.9keV**
- **Peak: 2500,409.2keV**
- **Live time: 227s**





Result

- **2nd data**
- **Time: 15:7:30→15:12:30**
- **Power: -1205v**
- **AMP:500+5.0**
- **All count: 103419**
- **Net count: 85879 (320.9—498.9keV)**
- **FWHM: 376.2—436.8keV**
- **Peak: 1956,409.2keV**
- **Live time: 226s**





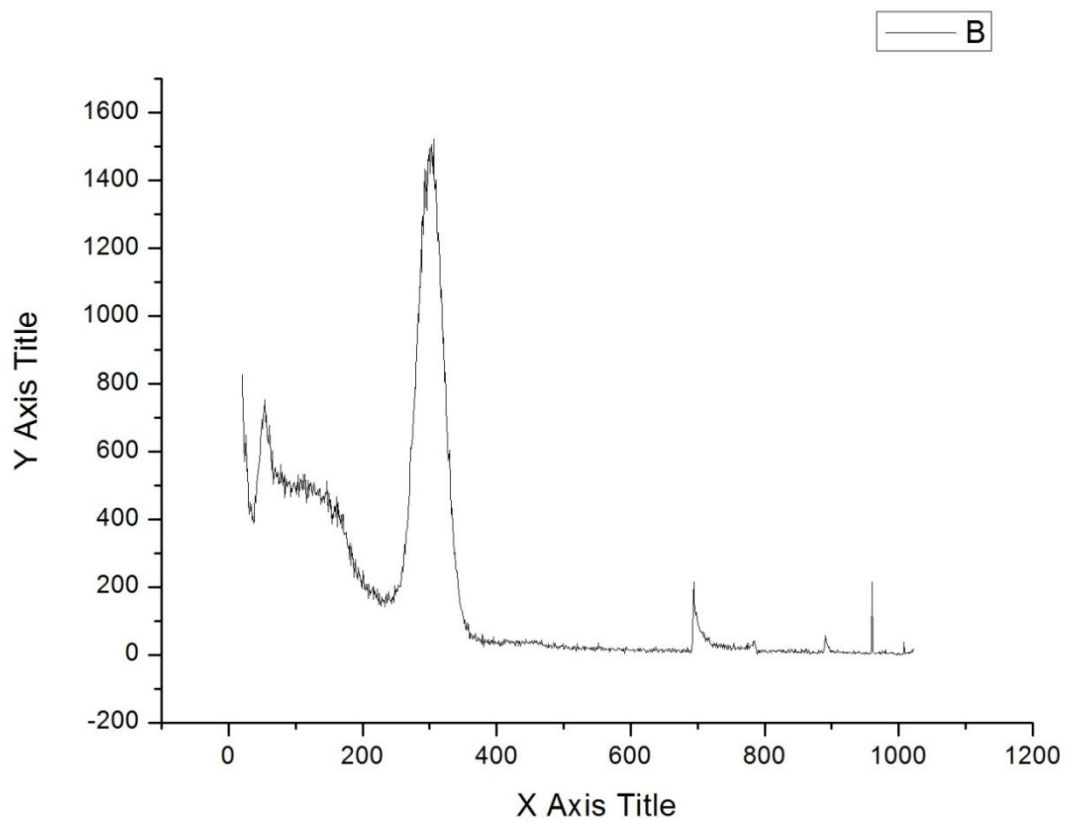
Result

- **3rd data**
- **Time: 10:20:30→10:25:30**
- **Power: -1205v**
- **AMP:500+5.0**
- **All count: 78844**
- **Net count: 65212 (320.9—498.9keV)**
- **FWHM: 278.9—324.8keV**
- **Peak: 1420,403.1keV**
- **Live time: 209s**





Result



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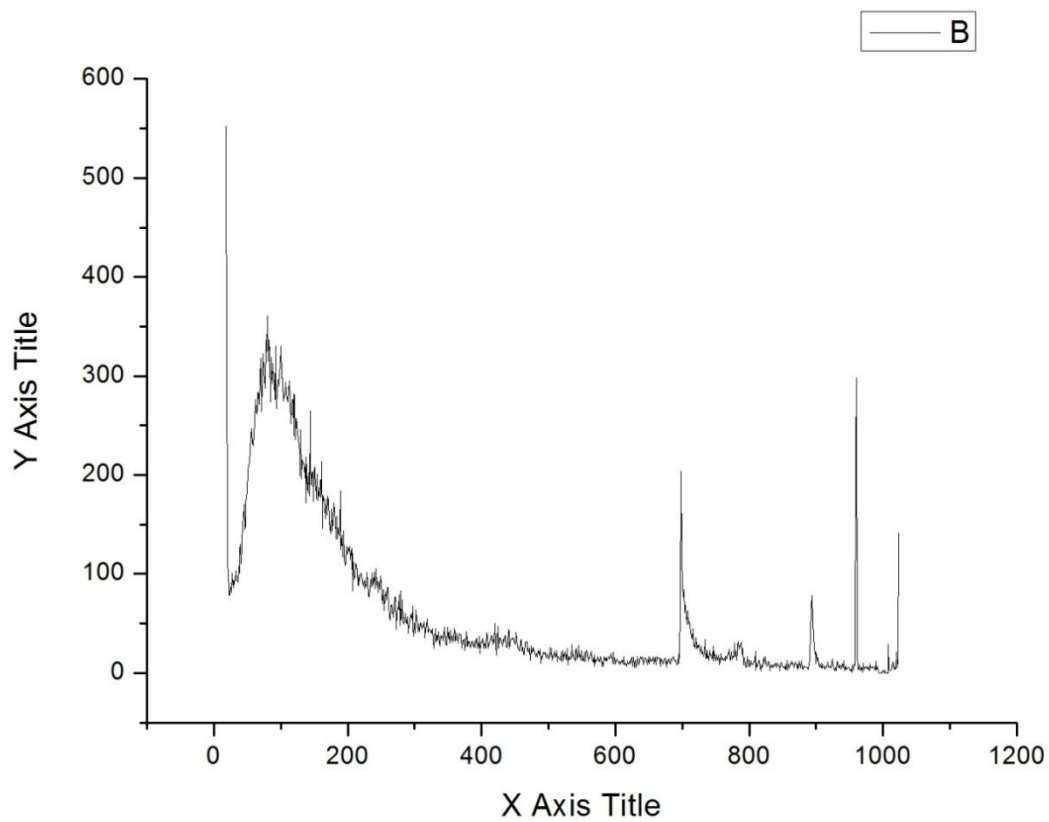
Result

- **Background**
- **Time: 10:25:30→10:30:30**
- **Power: -1205v**
- **AMP:500+5.0**
- **Net count: 6992 (320.9—498.9keV)**
- **Live time: 220s**





Result



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Process

- **By 1st & 2nd data**
- **$T=3.9\text{d}$, $T_{1/2}=2.7\text{d}$**

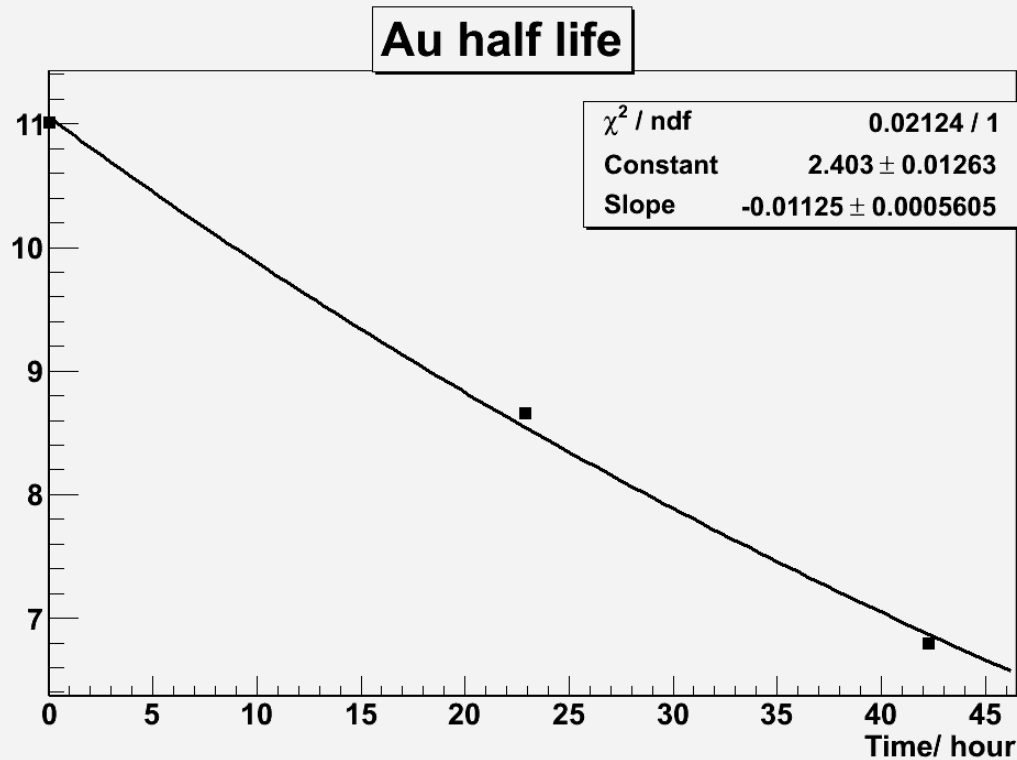
- **By 1st & 3rd data**
- **$T=3.6\text{d}$, $T_{1/2}=2.5\text{d}$**





Process

- Fit the data
- $T_{1/2}=2.57\text{d}$, fitting error=5%
- $(2.7-2.57)/2.7*100\%=4.8\%$



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Thank you!



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