



STUDY OF ^{104}Rh USING $(n_{\text{TH}}, 2\gamma)$ REACTION

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CONTENT

Introduction

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Results

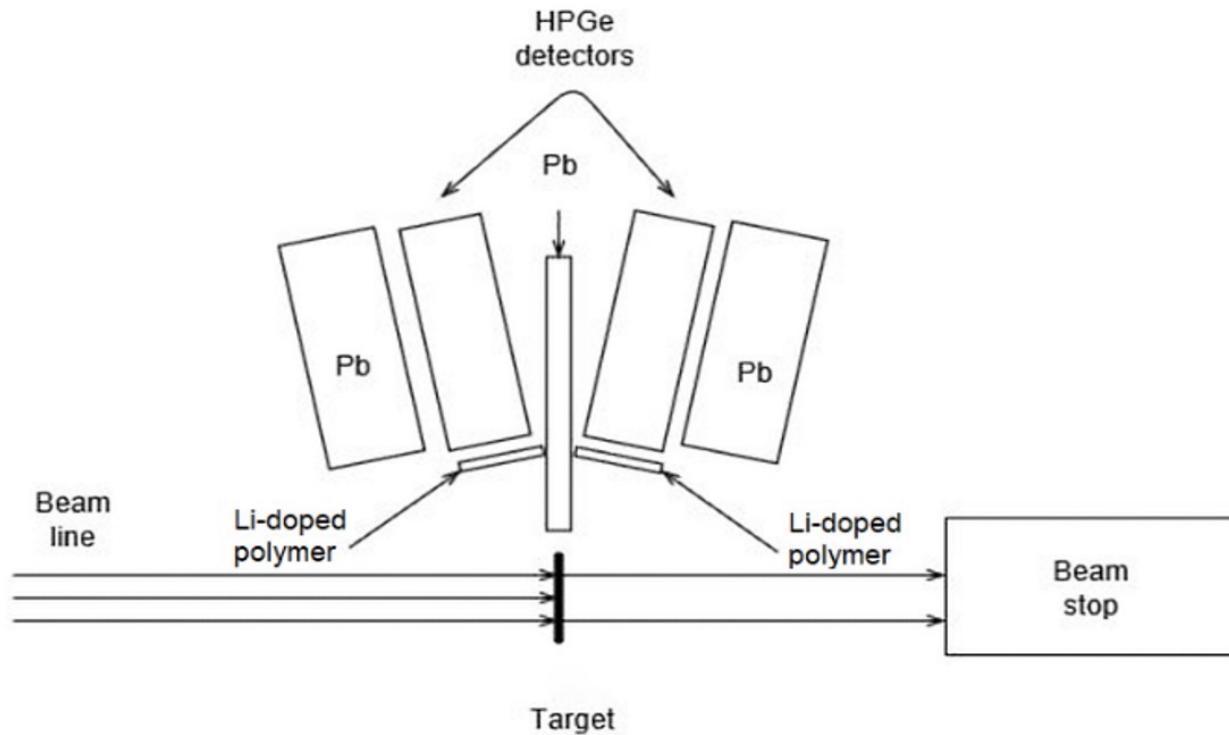


INTRODUCTION

- **Task:** Determination of nuclear structure parameters
 - gamma transitions
 - level scheme
 - level density
 - radiative strength function
- **Method:** 2 step γ cascade
 - detection of γ coinc. after (n_{th} , 2γ) reaction



SETUP SCHEME



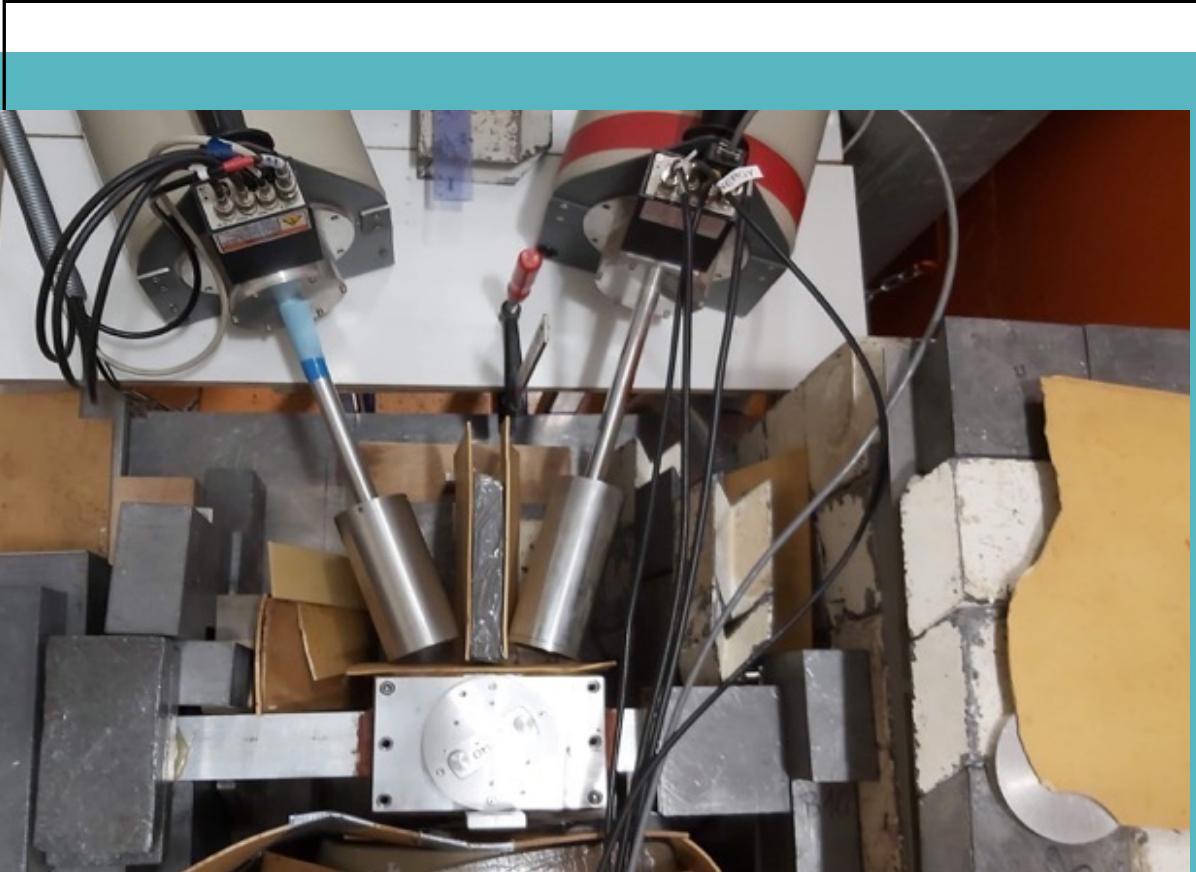
- Thermal neutron beam
- 2 HPGe detectors
- Target
- DAQ – ch and t
- Shielding
- Close geometry



PGAA facility of Centre for Energy Research (MTA EK), Budapest, Hungary



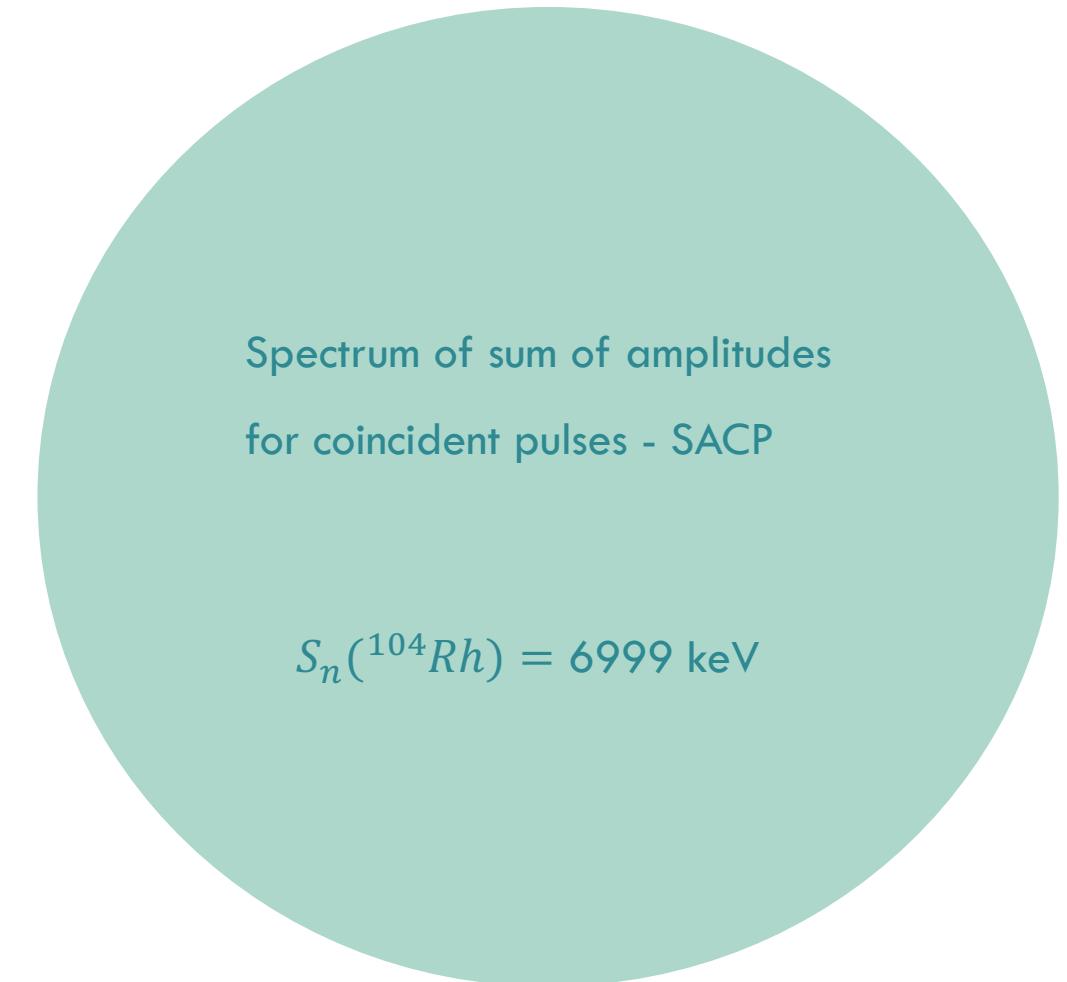
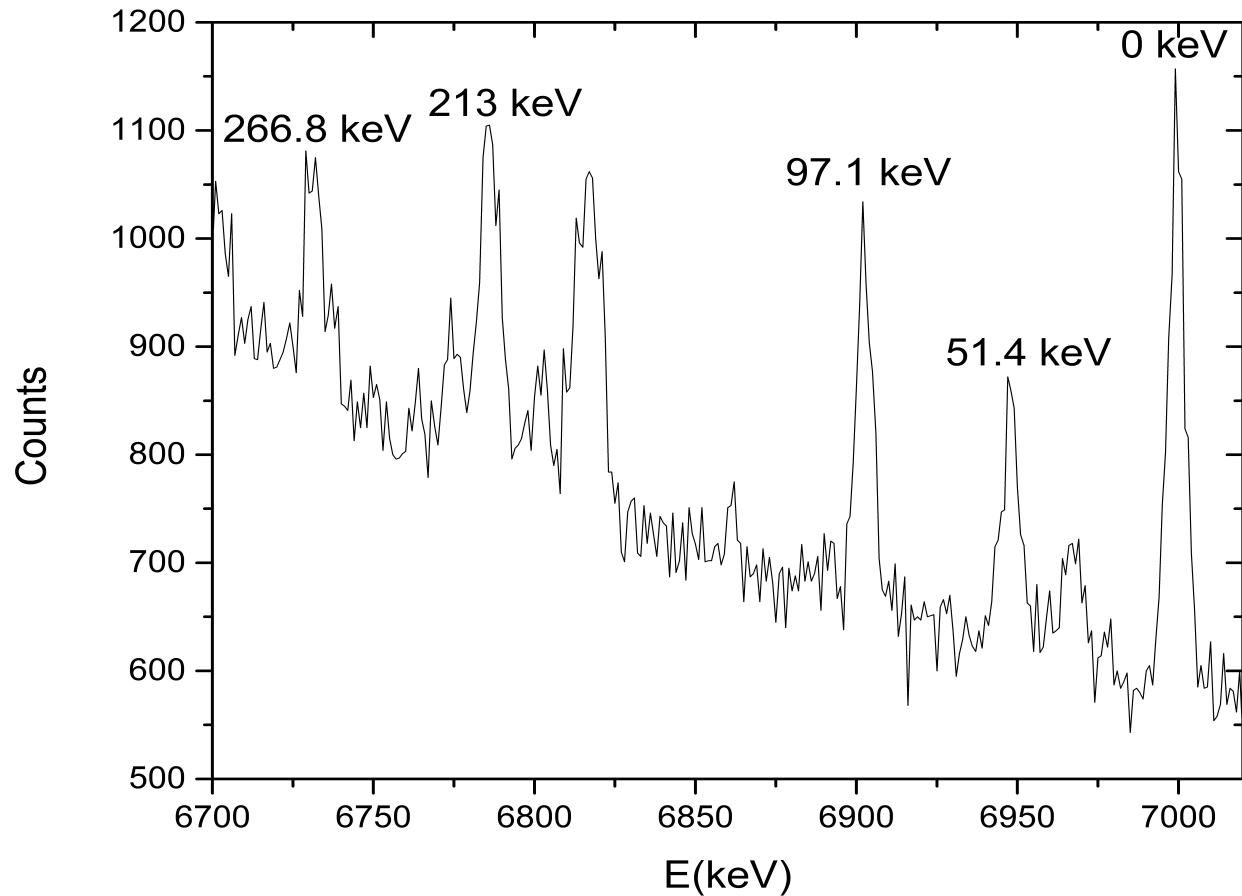
EXPERIMENTAL SETUP





RESULTS

SACP





RESULTS

LEVEL SCHEME

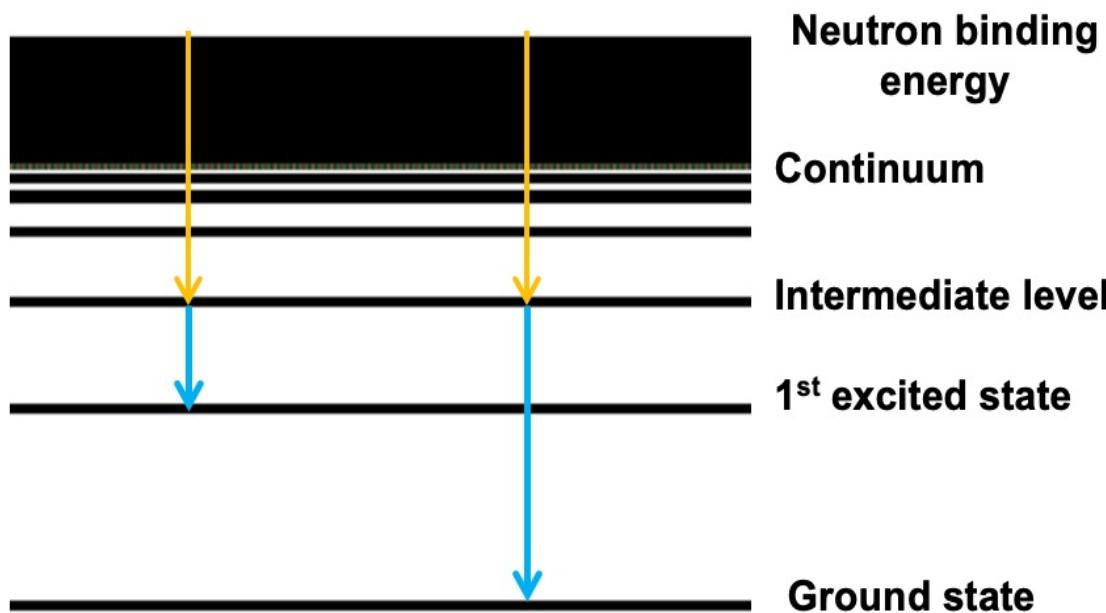
- Cascades from an initial to a defined final level
 - Compton background
 - Random coincidence
- Gating around the peak

$E(\text{level})^{\#}$	$J^{\pi\ddagger}$	$T_{1/2}^{\ddagger}$
0.0	1^{+}	42.3 s 4
51.42324 23	2^{-}	2.6 ns 2
97.0997 3	2^{+}	<0.6 ns
128.9679 5	5^{+}	4.34 min 3
175.2378 11	6^{+}	
180.8401 7	1^{+}	
186.0407 12	1^{-}	0.89 ns 30
197.8941 10	2^{+}	
213.0607 8	1^{+}	<1.2 ns
224.4194 10	$1^{+}, 2^{+}$	
266.7693 14	$1^{-}, 2^{-}$	<0.26 ns



RESULTS

LEVEL SCHEME

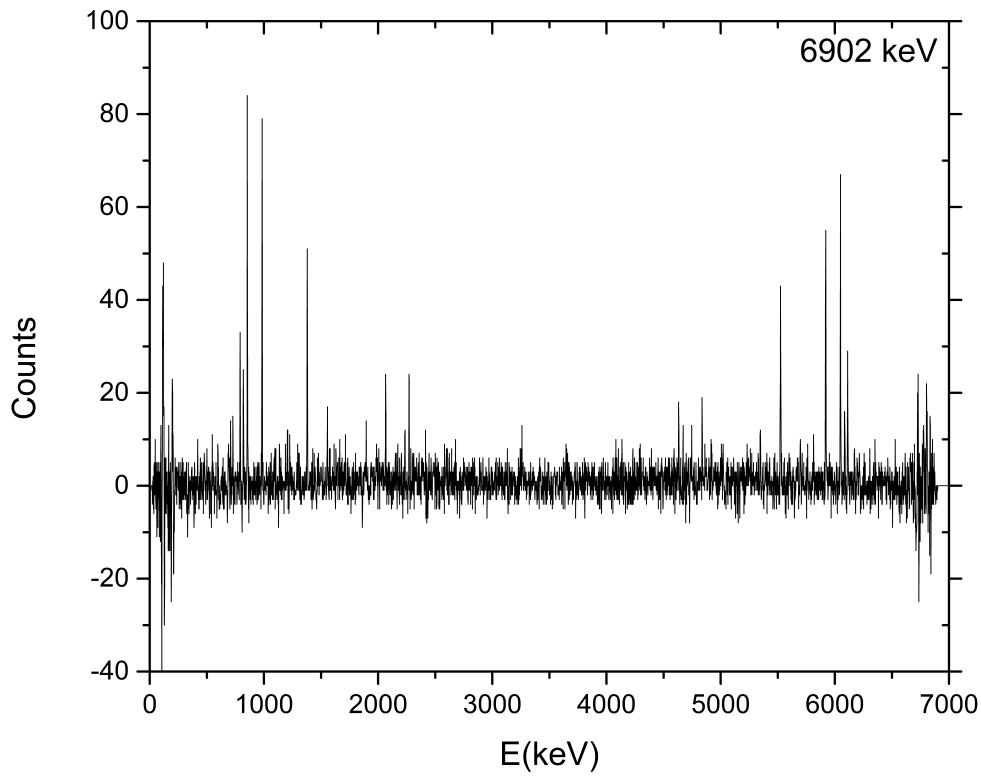
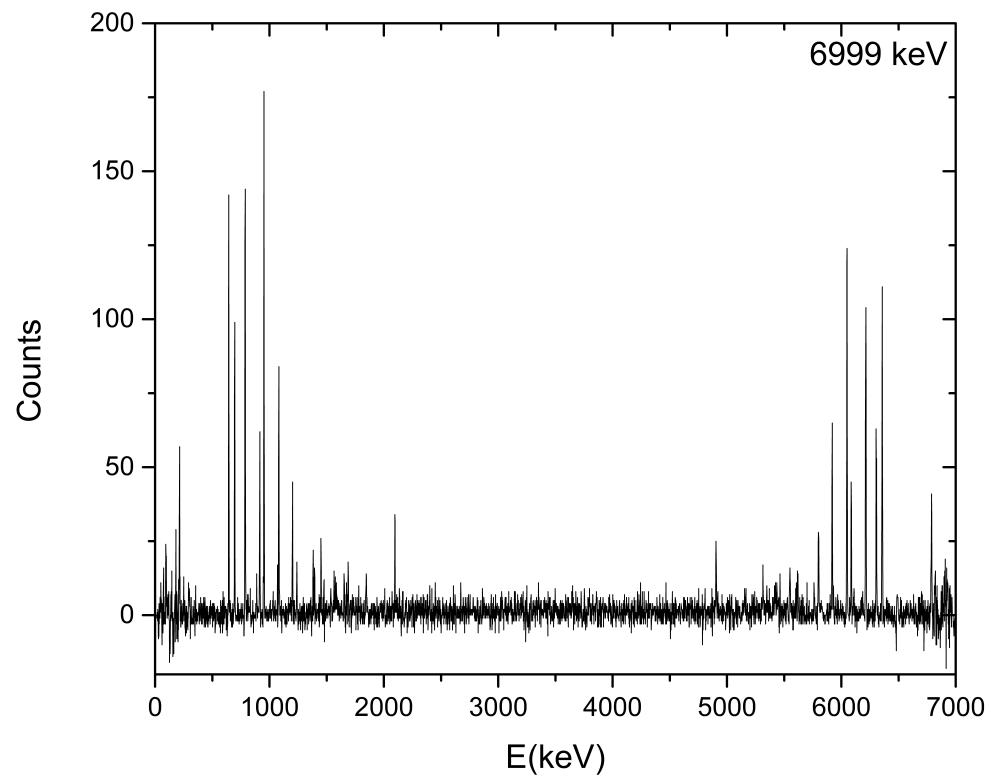


- Same γ in multiple cascades \Rightarrow primary
- If the γ is at ENSDF \Rightarrow assigned accordingly



RESULTS

TSC



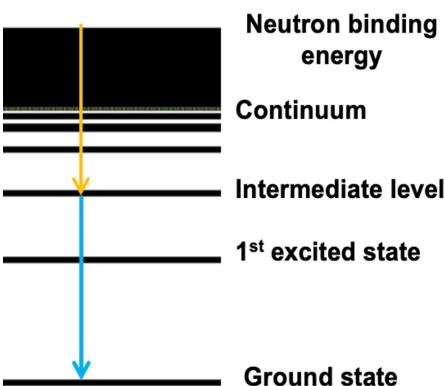


RESULTS

NEW

- Preliminary results for 6999 keV
- New data
- Known but not placed in the ls
- Under analysis (TSC)
- Low count rates

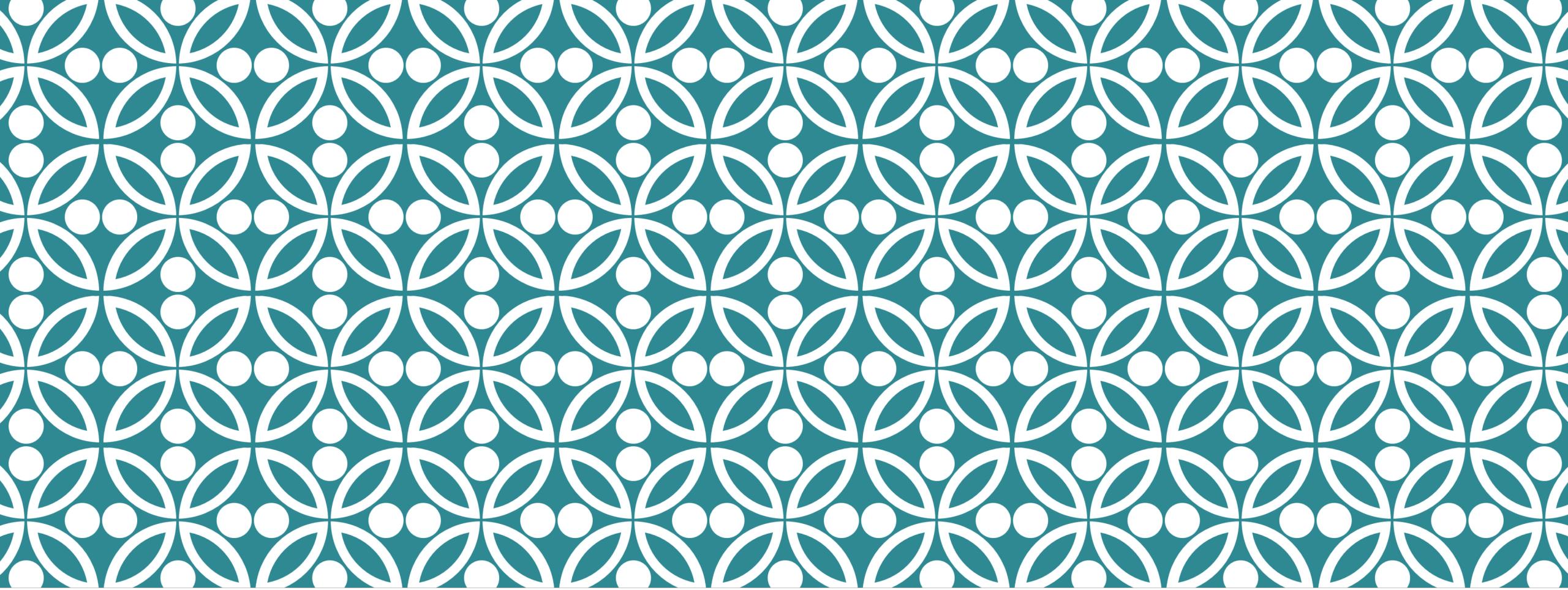
$$E_i = 6999 \text{ keV} - E_1$$



$$E_f = E_i - E_2$$

Cascade sum energy: 6999 keV					
Present work			ENSDF		
E₁	E₂	E_i	E₁	E₂	E_i
6817.1	180.4	180.4	6817.77	180.84	180.84
6785.3	213	213	6785.7	213.06	213.06
6355.2	643.4	643.4	6354.89	644.19	644.19
6303.7	694.8	694.8	6303.36	695.79	695.79
6211	786.7	786.7	6211.6	787.32	787.32
6083.8	914.8	914.8	6082.94	914.63*	915.65
6047	951.4	951.4	6046.76	951.39*	952.38
5917	1081.5	1081.5	5916.99*	-	1081.94
5797.9	1201.1	1201.1	5798.46*	-	1200.9
5547.6	1450.1	1450.1	5547.84*	-	-
4902	2096.5	2096.5	4902.54*	-	-

*In the database, but previously not placed in the level scheme



THANK YOU FOR THE ATTENTION!

Have a nice day ☺