

AGATA Experiments and Status

AGATA & AGAVA: $^{32}\text{S} + ^{110}\text{Pd}$ at 135 MeV Analysis

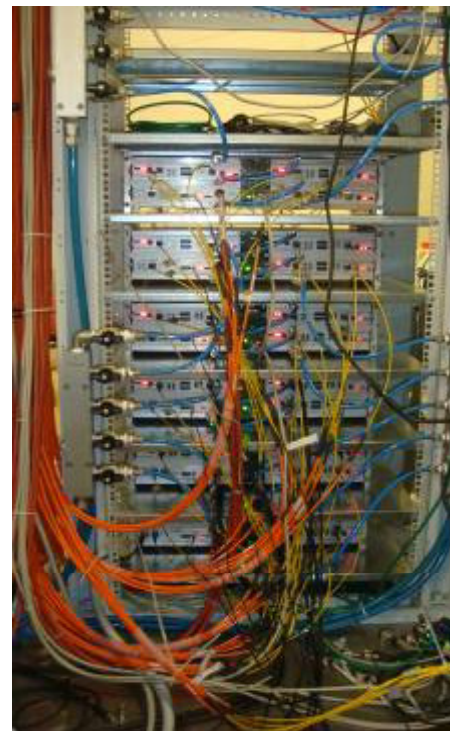
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AGATA + AGAVA September 2009

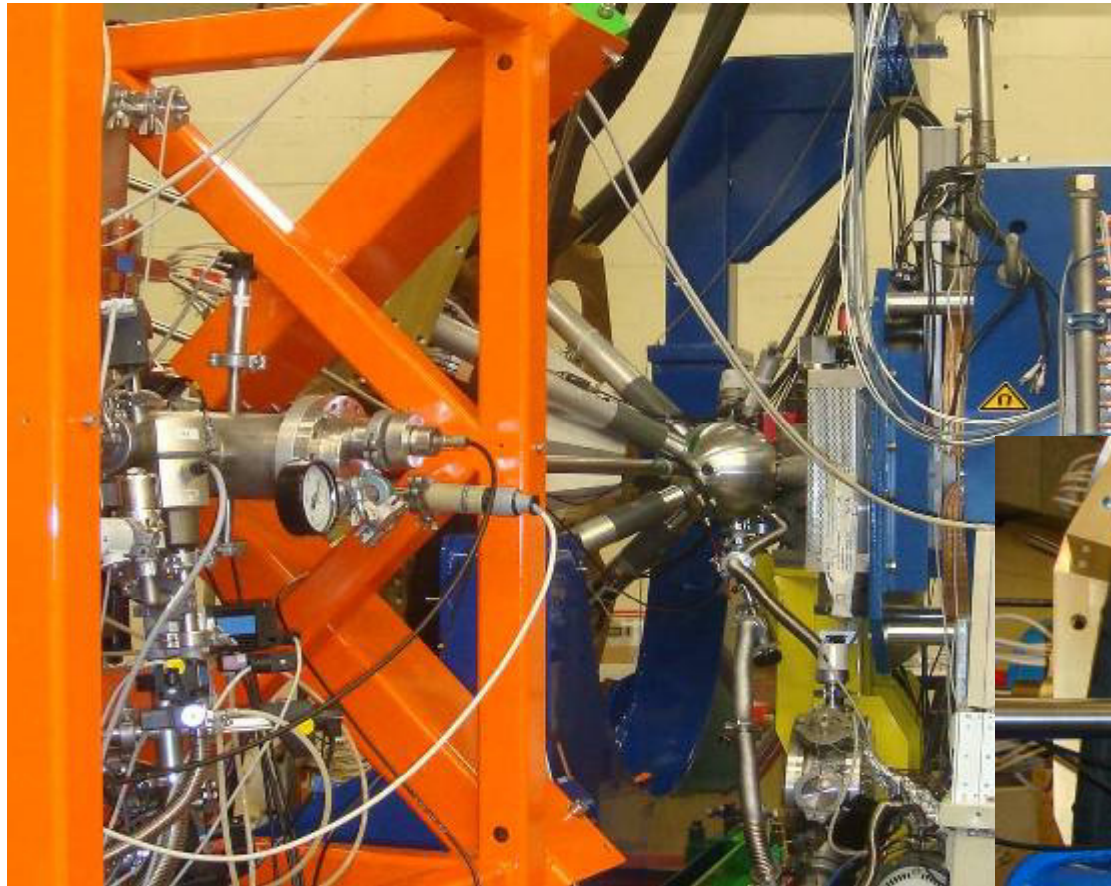
- ▶ $^{32}\text{S} + ^{110}\text{Pd}$ @ 135 MeV
- ▶ Ancillaries through AGAVA
 - ▶ LaBr array
 - ▶ TRACE Silicon detectors
- ▶ Data: Singles, Doubles, Triples
- ▶ Thin target ($500 \mu\text{g}/\text{cm}^2$)
- ▶ Thick Target ($670 \mu\text{g}/\text{cm}^2 + 8\text{mg Au}$)
- ▶ Fusion Evaporation with CN ^{142}Sm
 - ▶ ^{138}Sm (4n)
 - ▶ ^{138}Pm (p,3n)



See "Shape coexistence in ^{138}Sm and evidence for the rotational alignment of a pair of N=6 neutrons" E.Paul et al



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- ▶ Target Rotation = 80
- ▶ Prisma Angle = 82
- ▶ Silicon = 40 15 (5x5cm)
- ▶ Limited to 60enA (8khz)

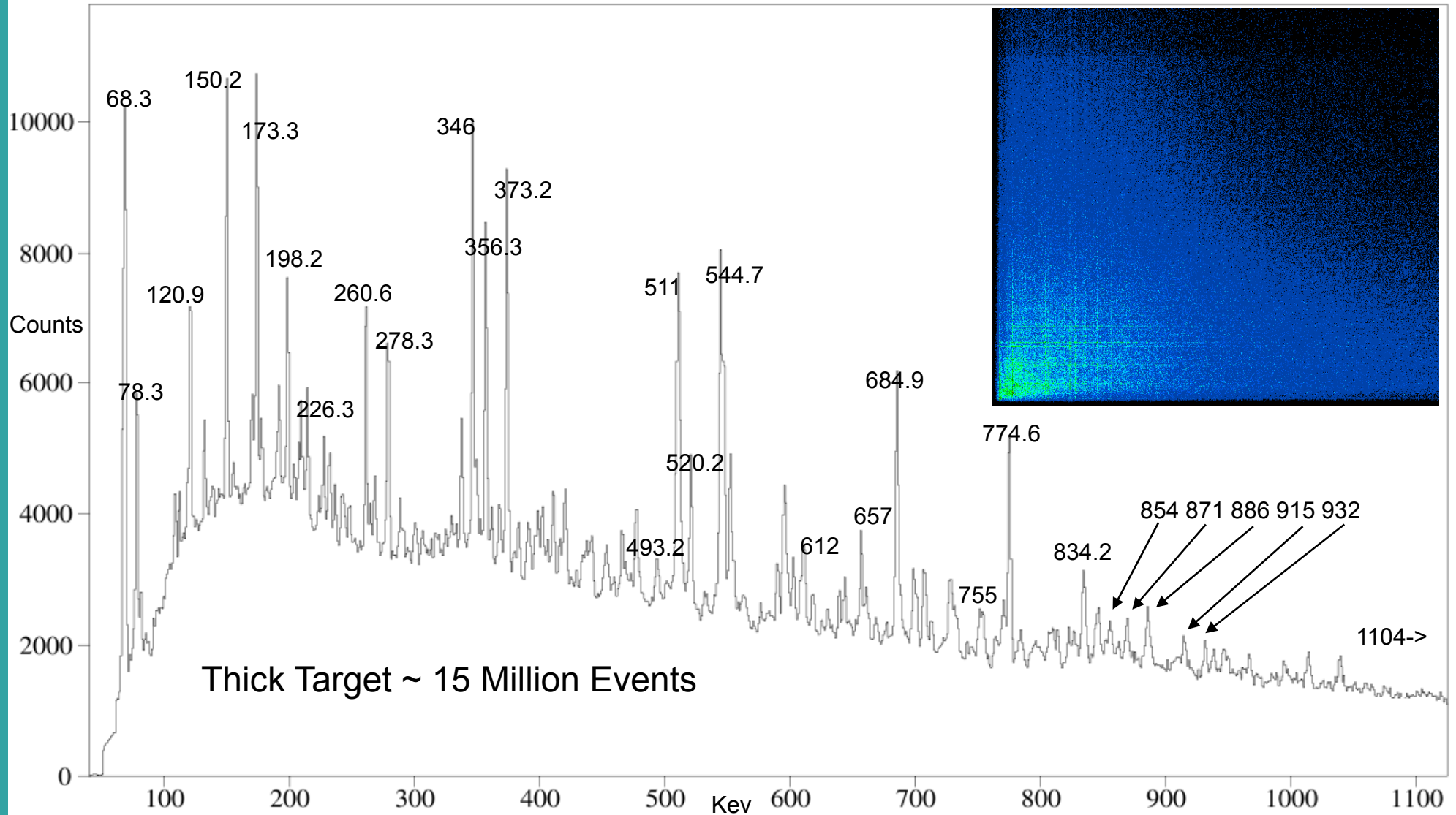
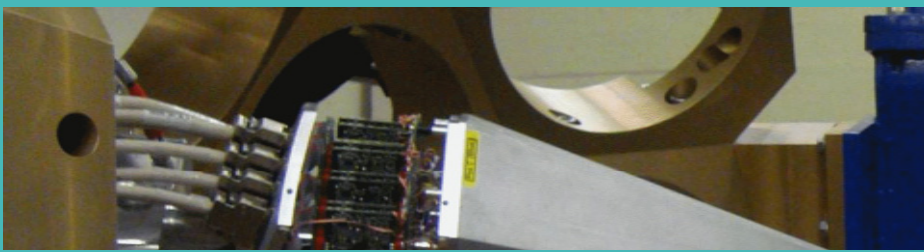


((F_AGATA_core > 0) AND ((F_LaBr3 > 0) OR (F_Si > 0))) OR:

1. (F_AGATA_core > 1) thin target
2. (F_AGATA_core > 1) **thick target**
3. (F_AGATA_core > 0) thin target
4. (F_AGATA_core > 2) thin target

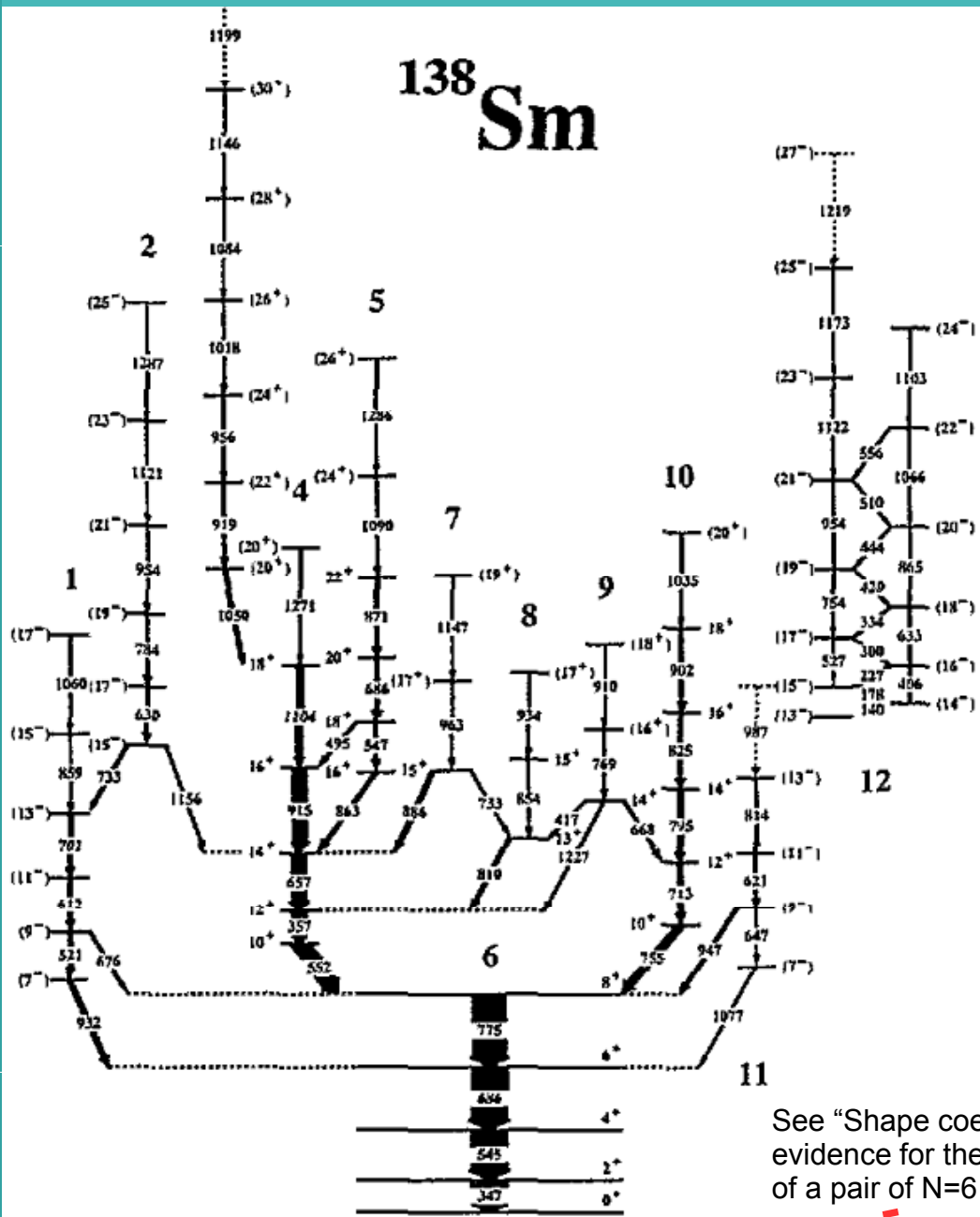
**Analysed part:
0.5TB / 1.4TB**

Gamma Coincidence Data

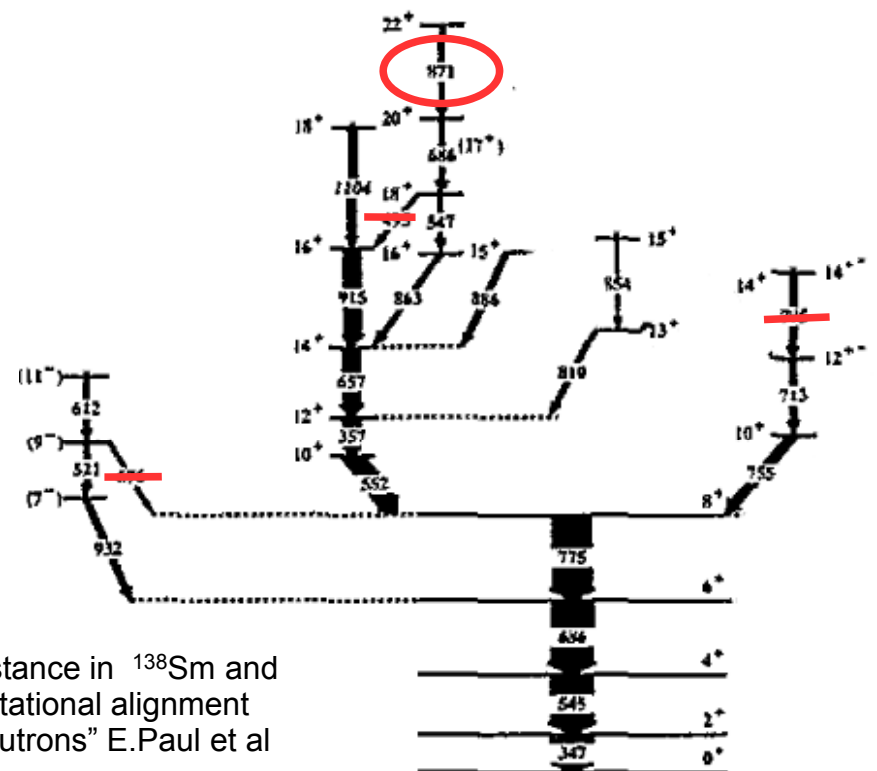


Ungated spectra, peaks labelled for ^{138}Sm , and prominent other lines

^{138}Sm Level Scheme

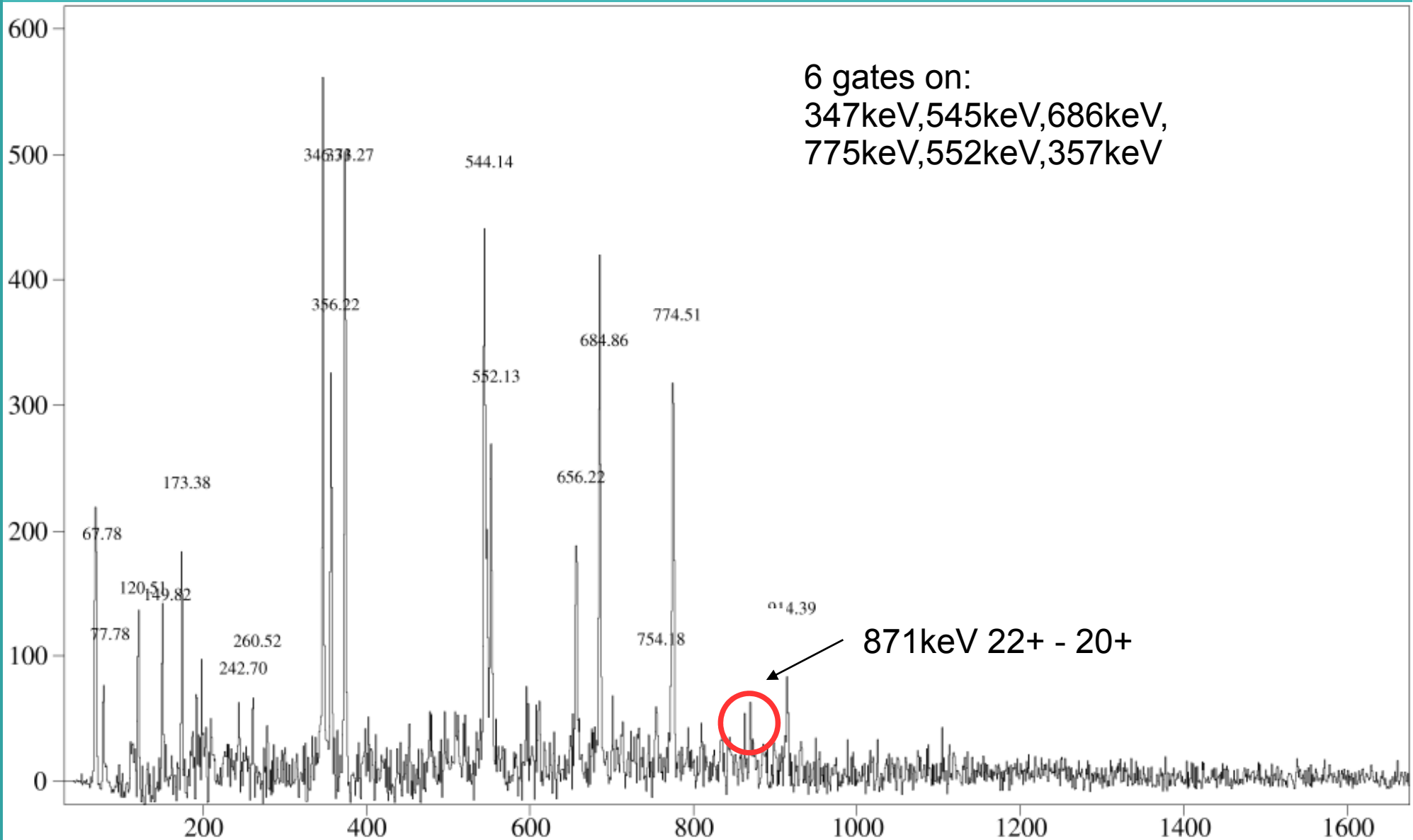


Right: ^{138}Sm Spectra, with all known Decays. Bottom, decay scheme as Found during experiment. As can be seen higher spin states not occupied. Possible highest spin state circled in red.

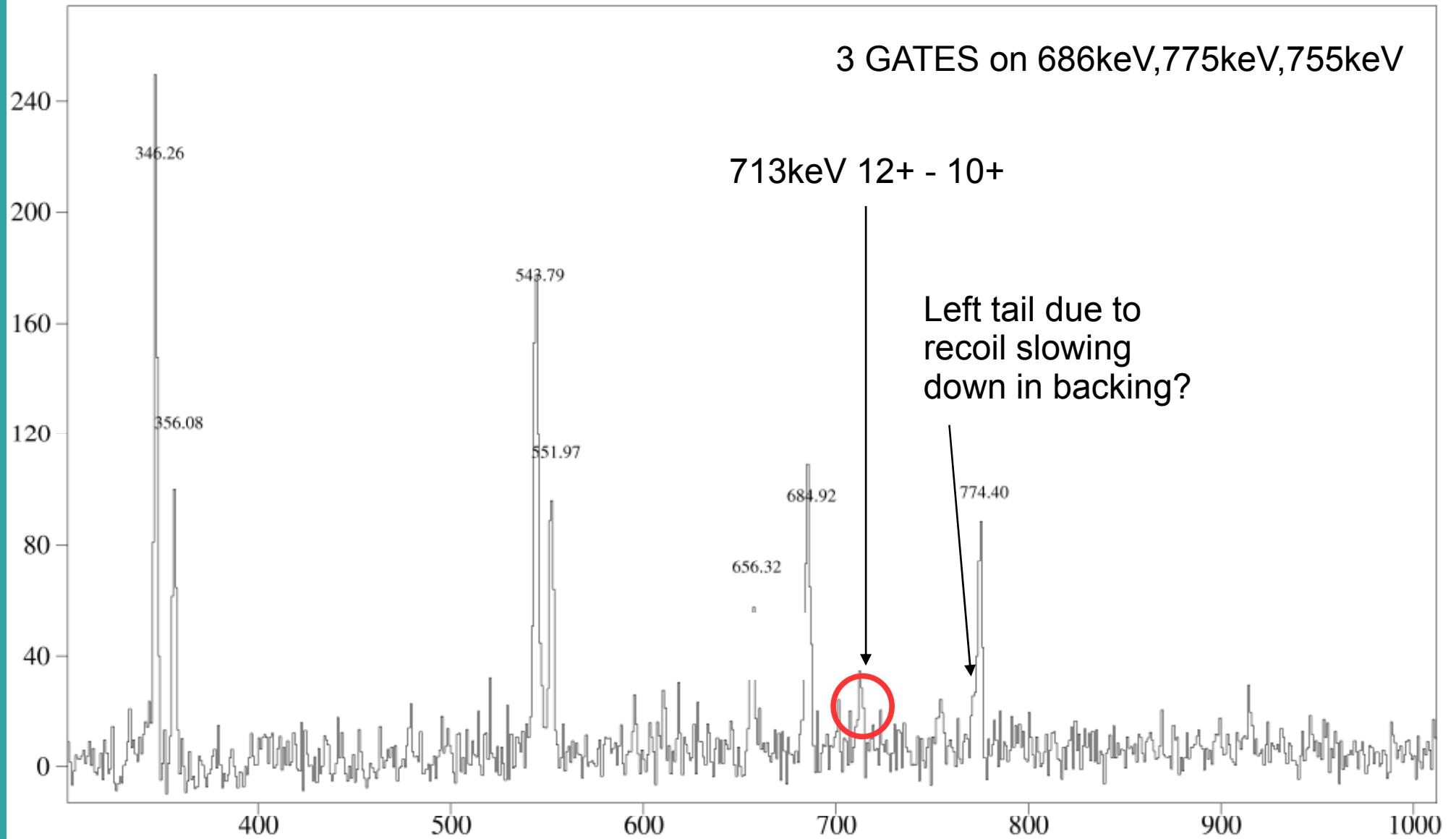


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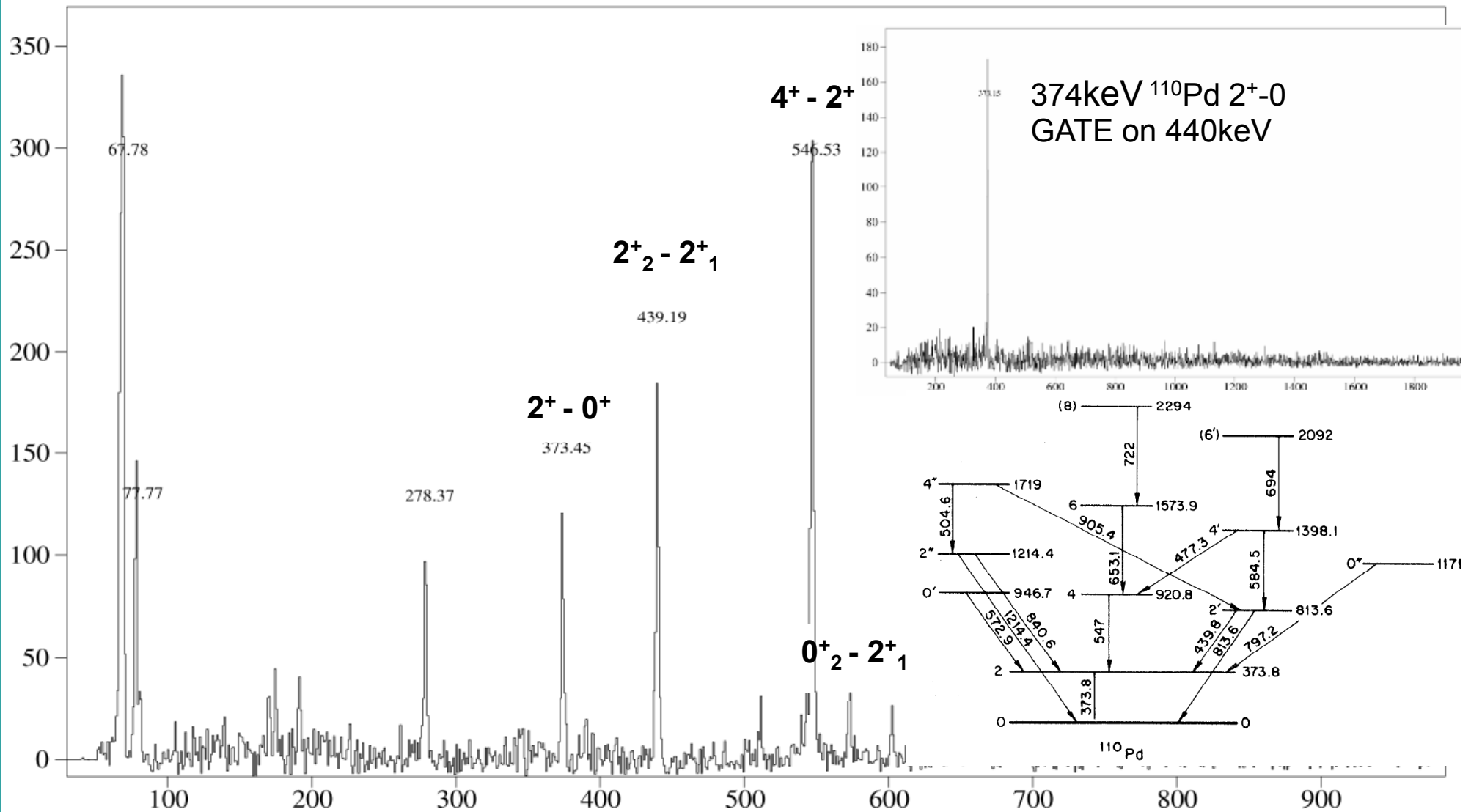
High-Spin States in ^{138}Sm



High-Spin States in ^{138}Sm

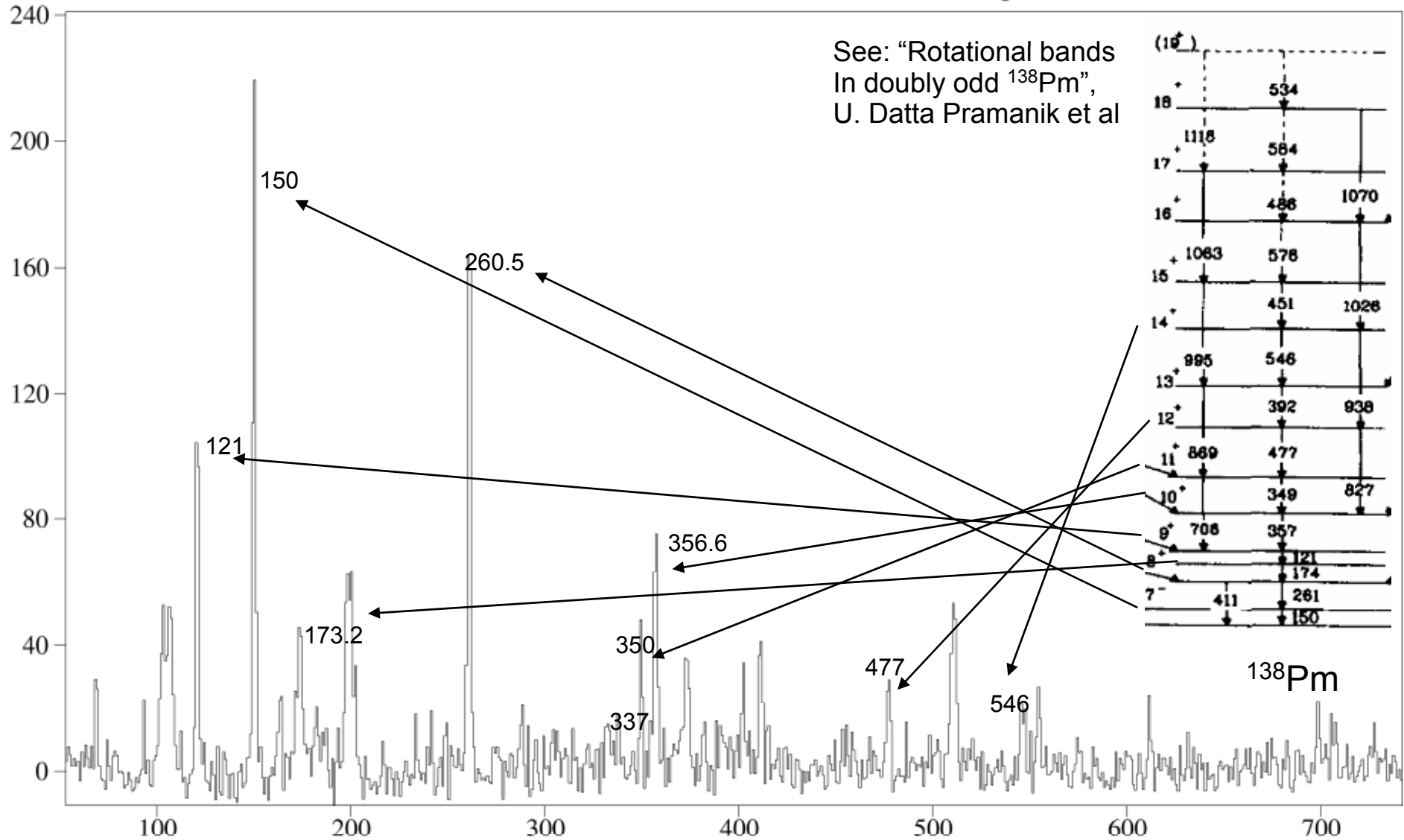
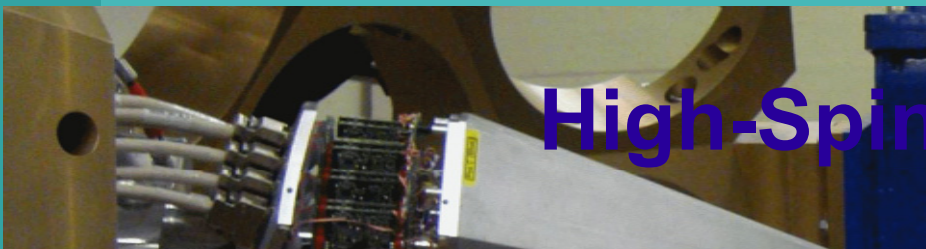


Coulomb Excitation of ^{110}Pd



Gate on 374Kev to give coincidence lines. Second gate, top corner on 440Kev to Define to 374Kev peak.

High-Spin States in ^{138}Pm



Gate on 173Kev (Strongest transition) to give coincidence lines. Shows that ^{138}Pm has been populated in the reaction.

Identified Gamma's for $^{110}\text{Pd}+^{32}\text{S}$ @ 135Mev

Energy (Kev)	Nuclei	Transition	Energy(Kev)	Nuclei	Transition
173.2	^{138}Pm	8^+-7^-	337.3	^{138}Pm	13^--11^+
150.2	^{138}Pm	6^--5^-	775	^{138}Sm	8^+-6^+
68.3	La?		226	^{138}Sm	16^--15^-
346.8	^{138}Sm	2^+-0^+	477	^{138}Pm	12^+-11^+
374	^{110}Pd	2^+-0^+	495	^{138}Sm	18^+-16^+
357	^{138}Sm	12^+-10^+	521	^{138}Sm	9^--7^-
545	^{138}Sm	4^+-2^+	552	^{138}Sm	10^+-8^+
511	Positron	Anihilation	612	^{138}Sm	11^--9^-
440	^{110}Pd	2^--2	657	^{138}Sm	14^+-12^+
120.9	^{138}Pm	9^+-8^+	755	^{138}Sm	10^+-8^+
260.6	^{138}Pm	7^--6^-	854	^{138}Sm	15^+-13^+
278.3	?		871	^{138}Sm	22^+-20^+
685.9	^{138}Sm	6^+-4^+	886	^{138}Sm	15^+-14^+
78	La?		915	^{138}Sm	16^+-14^+
191	?		932	^{138}Sm	7^--6^+
214.3	?		1104	^{138}Sm	18^+-16^+



Conclusion & Summary

- Still very preliminary results
- First gamma-gamma matrix of tracked gammas
- First high-spin states identified. Till 22 ħ
- ^{138}Sm & ^{138}Pm populated in the reaction
- Coulomb Excitation of ^{110}Pd , no excited states of ^{32}S

- TODO list:
 - Use the complete statistics of thick target data (x3)
 - Identify more reaction channels
 - Analyse the thin target data (x30)
 - Correlation and timing through AGAVA