

Measuring astatine-211 yield using a CdTe detector



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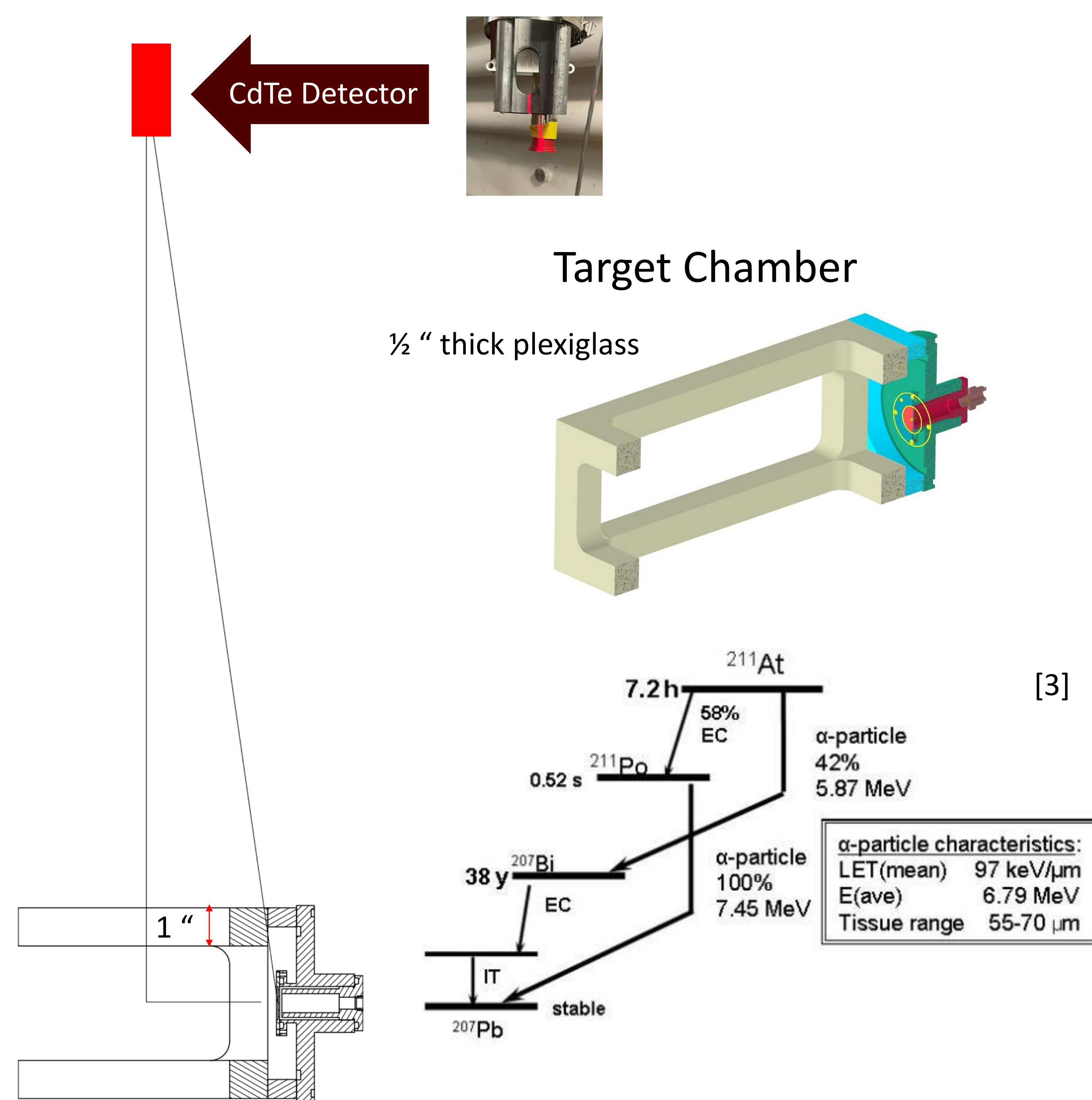
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Introduction

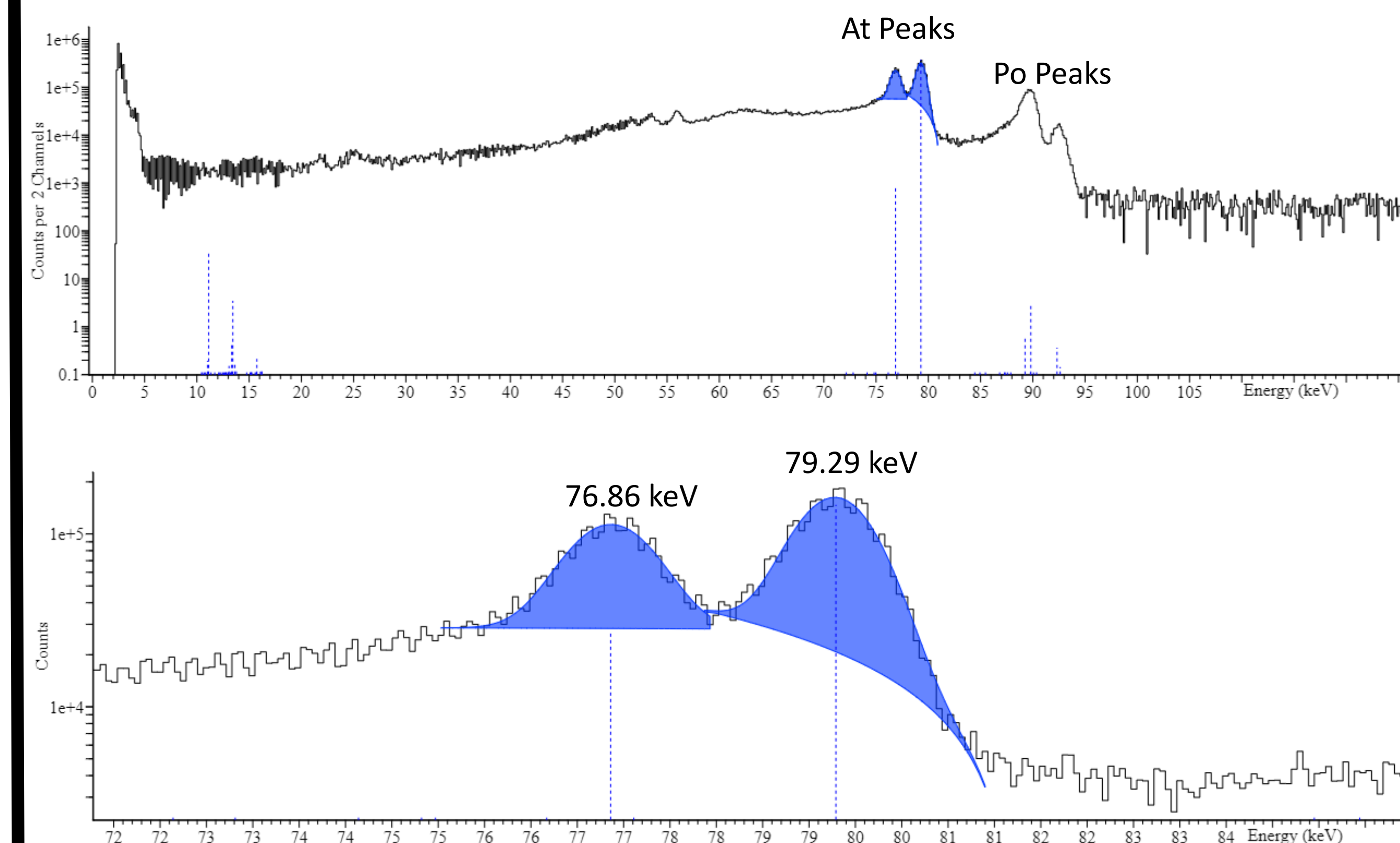
- ²¹¹At is a promising radioisotope for cancer treatment [1]
- ²¹¹At produced using the ($\alpha,2n$) reaction on a ²⁰⁹Bi target [2]
- Measured ²¹¹At x-rays using a CdTe detector (AMPTTEK)
- Compared to ¹³³Ba (calibration source) x-ray spectra
- Want to use spectra to quantify how much activity has been produced before target extraction

Experimental Set Up

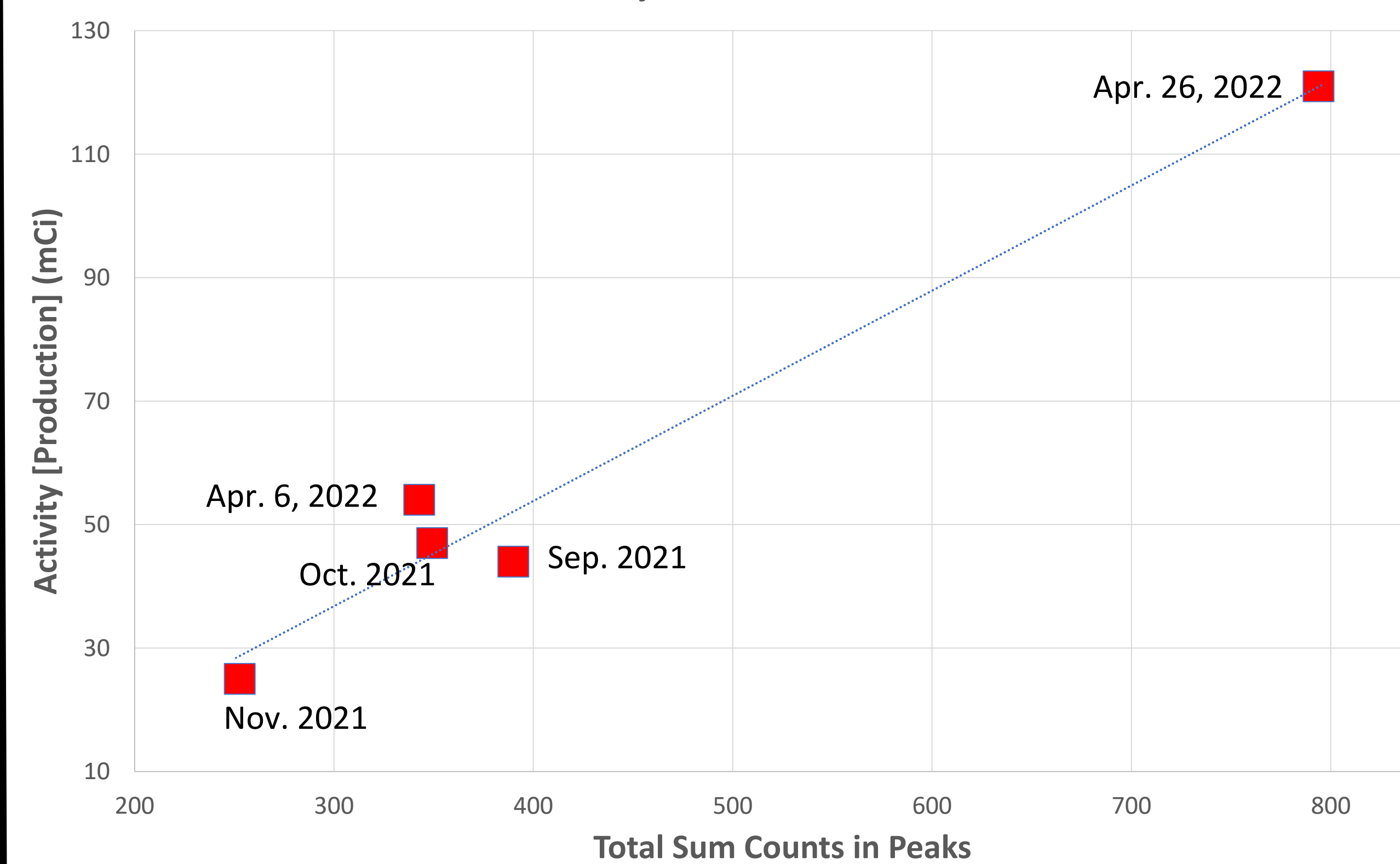


- X-rays attenuated 78-89% [4]

²¹¹At X-Ray Spectra



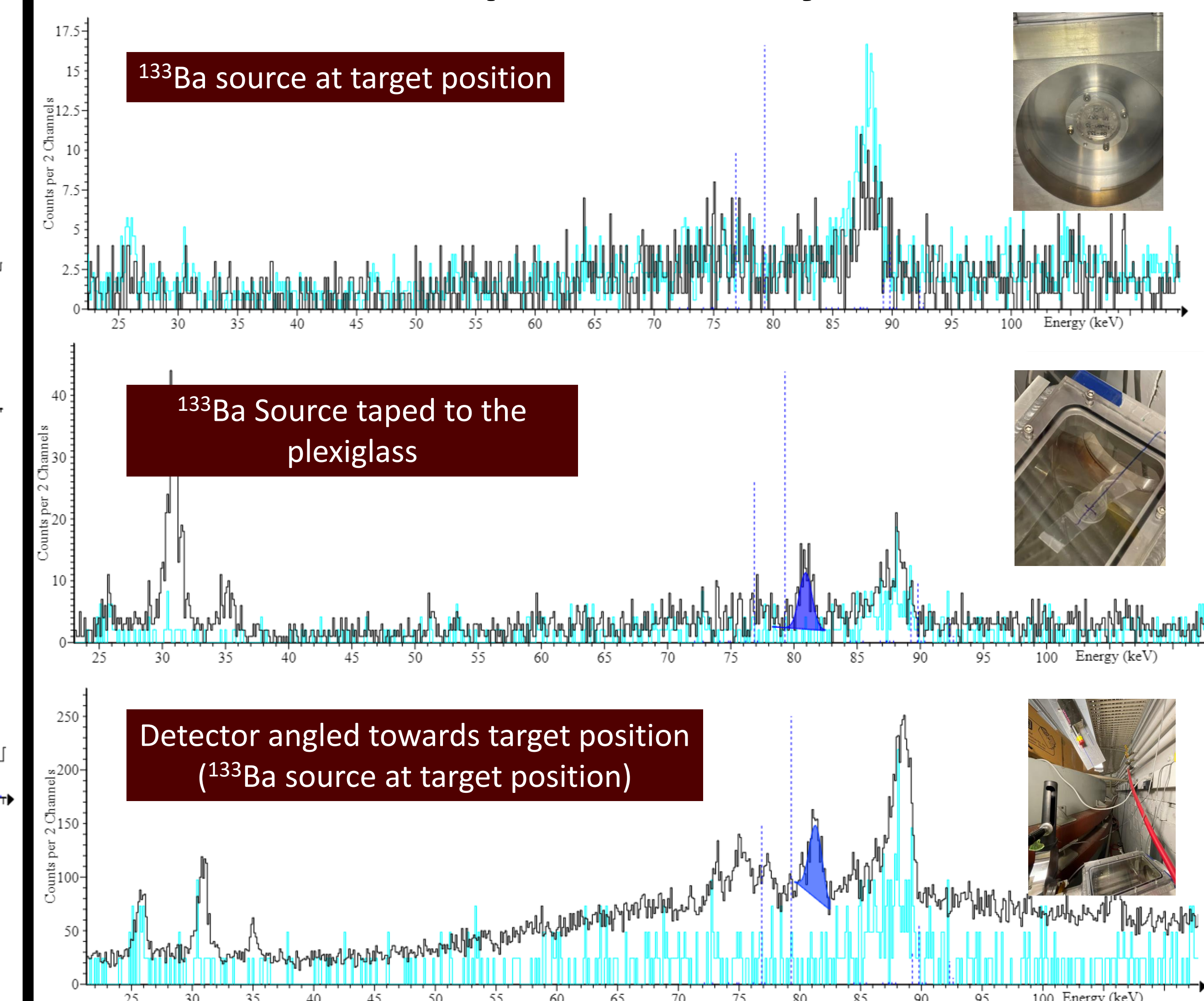
Activity vs At-211 Counts



$$\text{Total Sum} = \frac{\sum \text{CPS Peak 1} + \text{CPS Peak 2}}{n}, \text{ where } n = \text{number of spectra}$$

- Spectra were analyzed using Interspec software, counting rates were extracted for each peak
- Positive correlation between total counts in ²¹¹At peaks and activity produced

¹³³Ba Spectra Analysis



Cyan line on spectra: Background

Conclusions

- ²⁰⁹Bi target was being shielded from CdTe detector
- Highly probable that the ²¹¹At x-rays were measured from recoil or strongly attenuated

Future Directions

- ²¹¹At production run with detector in new position, facing target
- Correlate spectra more directly to amount of ²¹¹At produced

References

- [1] D. Scott Wilbur. NIDC Newsletter 10 (2017)
- [2] J. D. Burns, *et al.* Chem. Comm. 56, 63 (2020)
- [3] M. R. Zalutsky, *et al.* Curr. Radiopharm. 4, 3 (2011)
- [4] G. Weber, X-Ray attenuation & absorption calculator. GSI (accessed July 18, 2022)

Acknowledgements

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