

# AI CRIS COLLAB 2025

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## Overview

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Physics Case

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Experiment

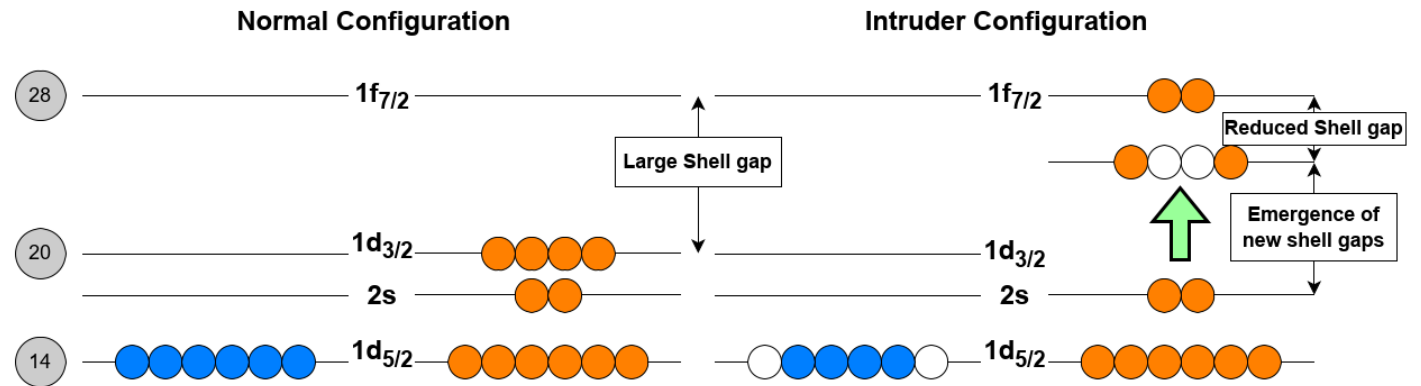
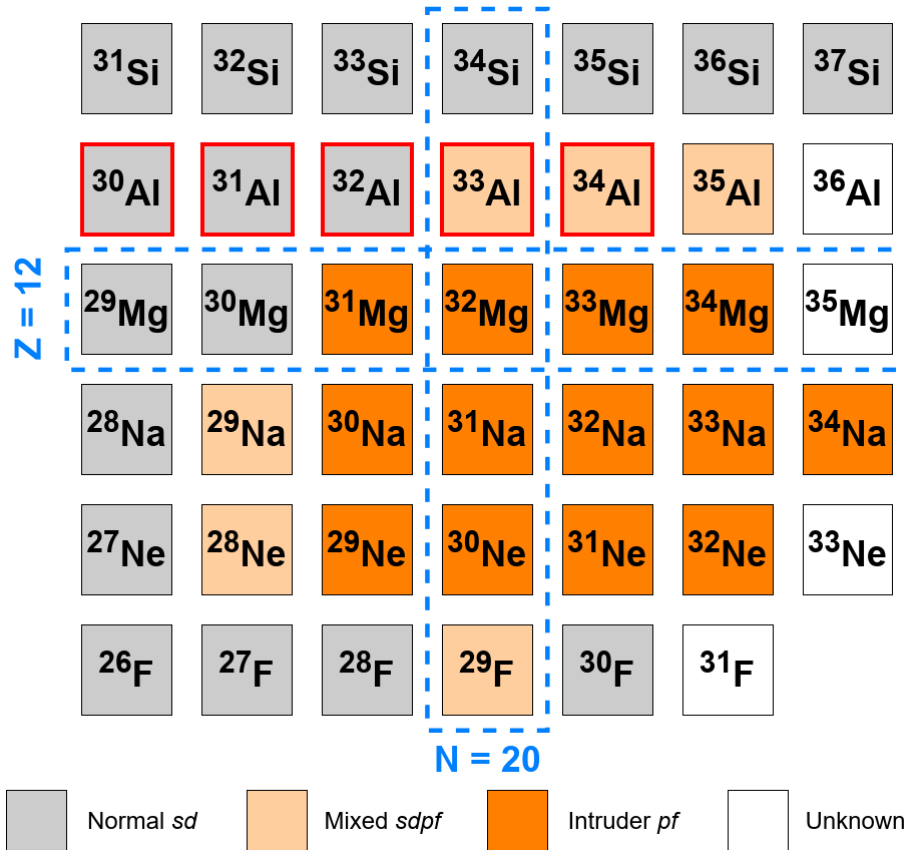
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Results

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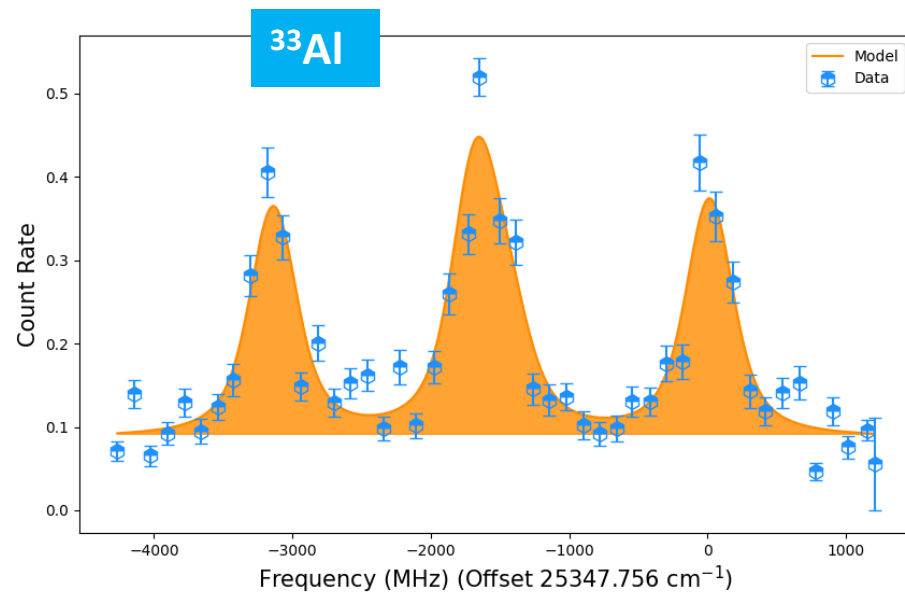
Next steps and discussion

# Island of Inversion



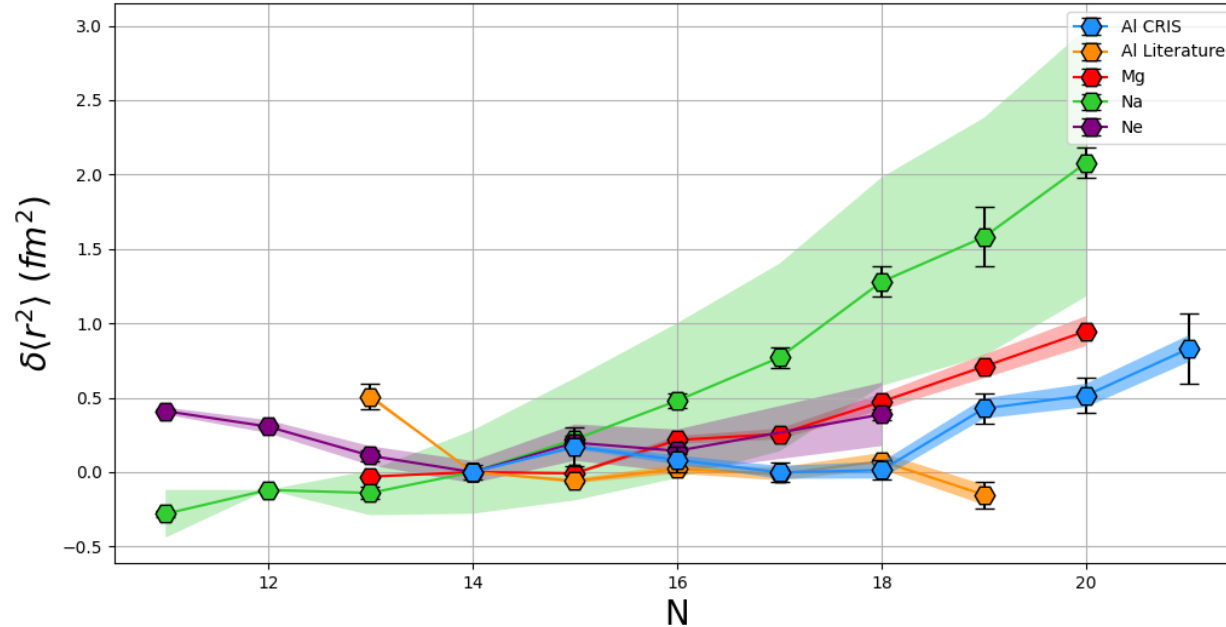
# Experiment:

- Experimental campaign was split across 2 runs
- Both runs very challenging!



Isotope	Scans total
<sup>26</sup> Al	3
<sup>27</sup> Al	34
<sup>28</sup> Al	1
<sup>29</sup> Al	15
<sup>30</sup> Al	4
<sup>31</sup> Al	7
<sup>32</sup> Al	3
<sup>33</sup> Al	4
<sup>34</sup> Al	2

# Charge Radii in the Region



Why does  $^{32}\text{Al}$  display increase when other measurements place it outside lol?

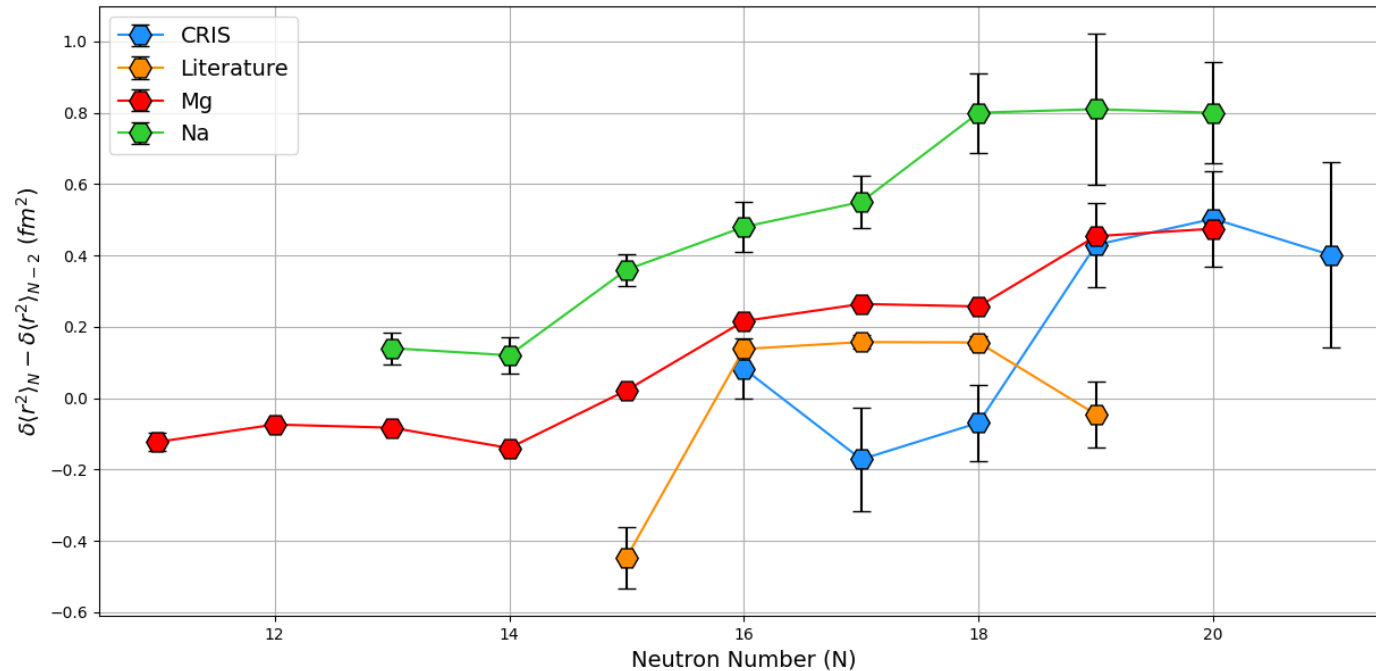
- Plotted using CCSDT(Q) F and M calculations from Leonid [1]
- Lit values replotted using CCSDT(Q)
- $N = 14-18$  displays excellent agreement with Lit.
- Increasing trend from  $N = 19-21$
- Magnitude of the increase comparable with the region
- $^{33}, ^{34}\text{Al}$  support conclusion from moments which suggest significant mixing [2, 3]

[1] L. V. Skripnikov et al., Physical Review A **110** (2024)

[2] P. Himpe et al., Physics Letters B **658** (2008)

[3] H. Heylen Physical Review C **94**, 034312 (2016)

$$\delta\langle r^2 \rangle_N - \delta\langle r^2 \rangle_{N-2}$$



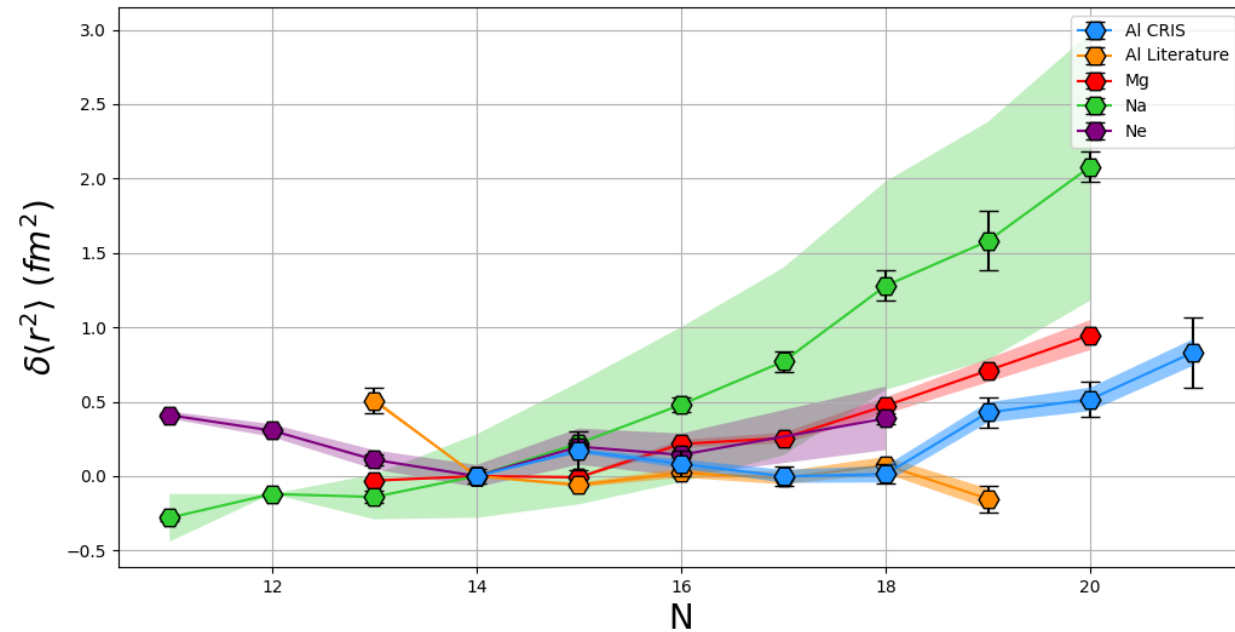
- To decouple from the influence of F and M
- Show the relative change between N and N-2
- Al displays a similar trend to Mg and Na

# Current Status

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- Analysis finished!
- This year was dedicated to finishing my thesis and defending
- Paper being prepared and written
- Calculations from G. Hagen & T. Miyagi of the charge radii up to  $N = 21$
- **Where to submit to?**
- Calculations required for better understanding of  $^{32}\text{Al}$
- Shed light on level of intruder mixing in  $^{33, 34}\text{Al}$

# Thank you!



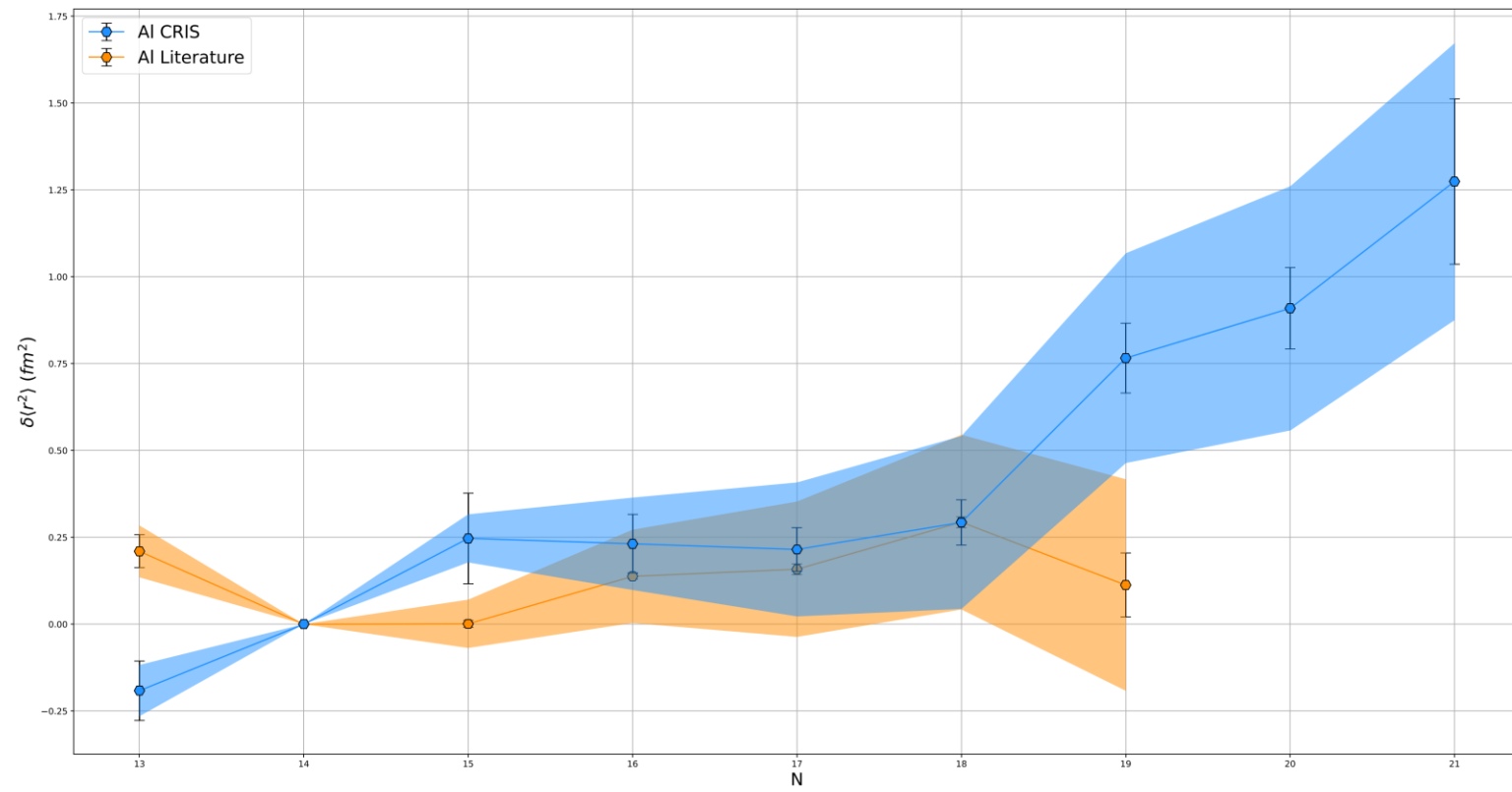
Conclusion:

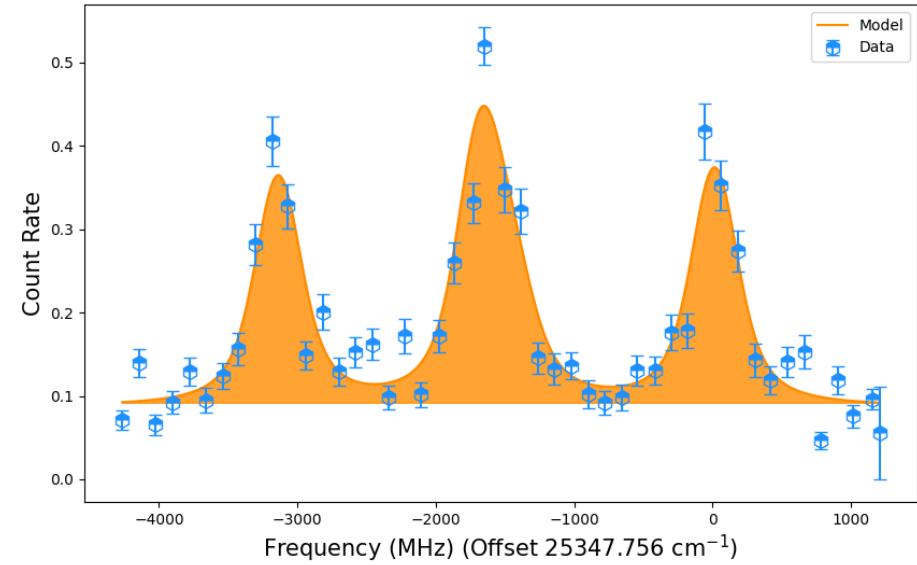
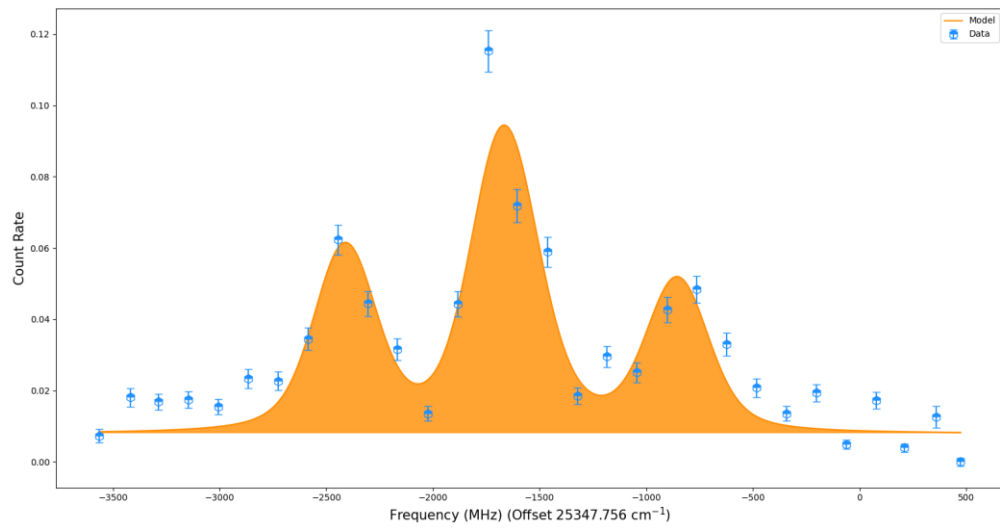
- Analysis complete and defended
- Where to submit to?
- Calculations being prepared



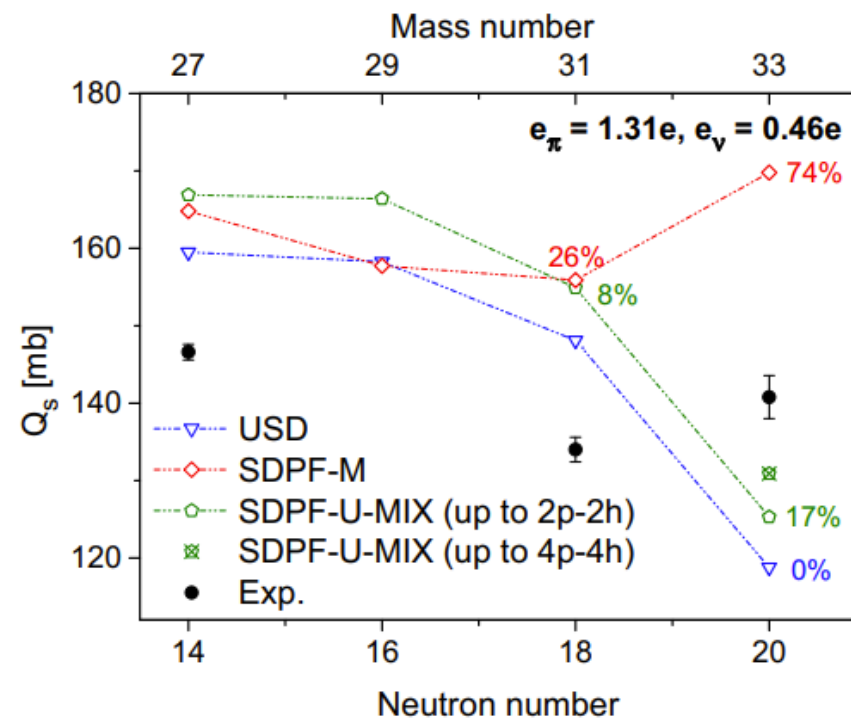
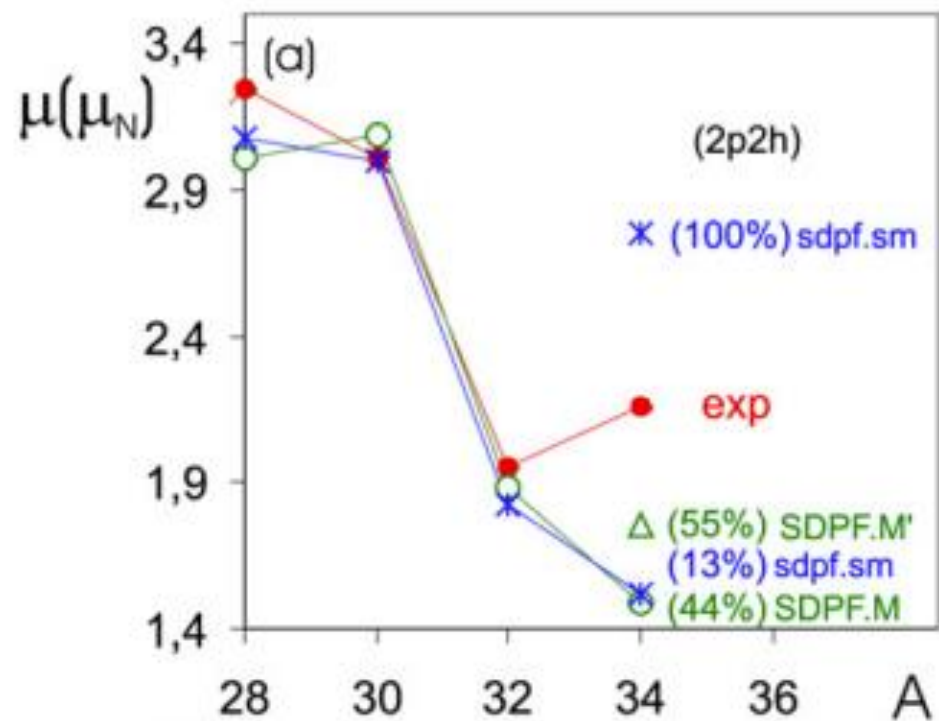
# Back Up

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$^{33}, ^{34}\text{Al}$  Spectra



# Moments