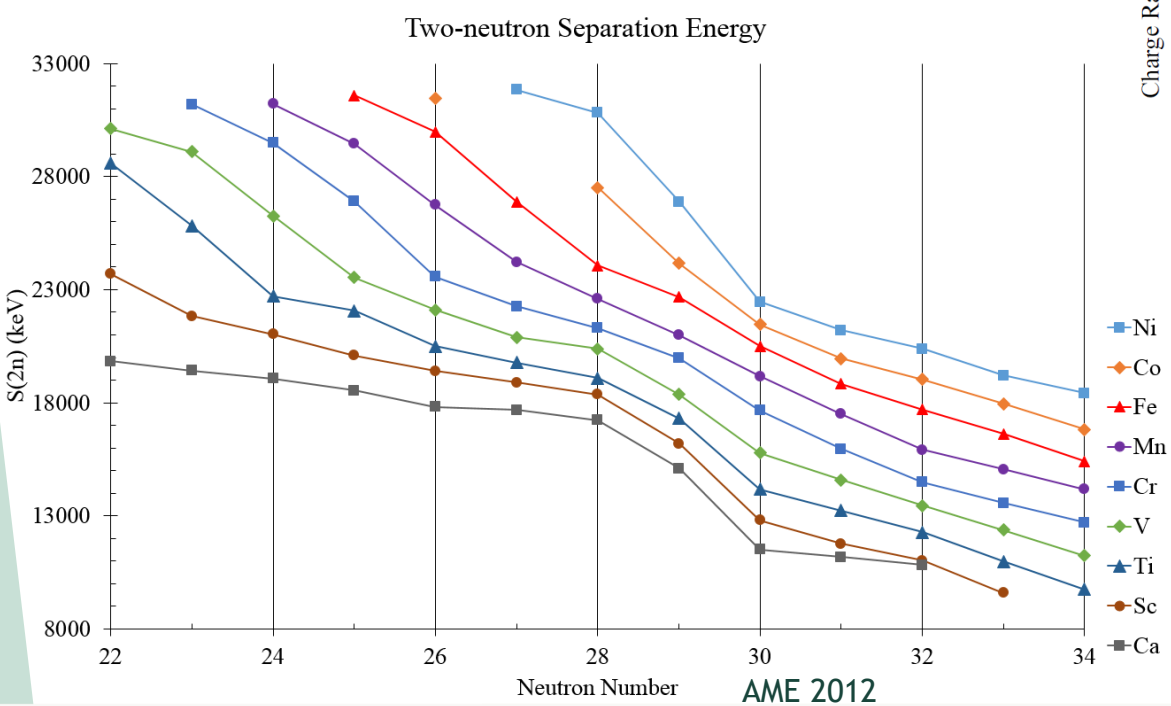
Charge radii and nuclear moments of ^{52,53}Fe, and the shell-closure signature at *N*=28

Andrew J. Miller[1,2]

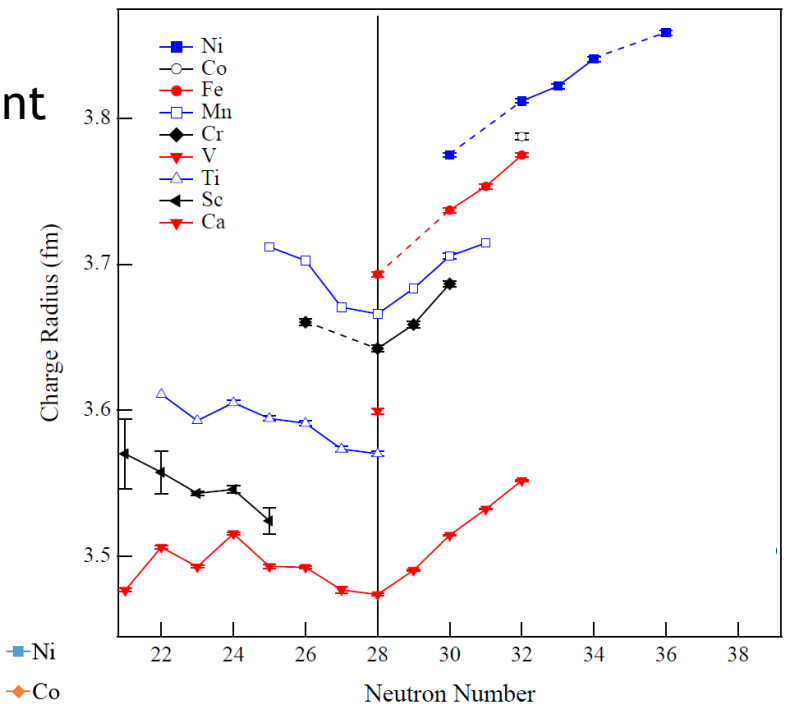
[1]*National Superconducting Cyclotron Laboratory,*
[2]*Department of Physics and Astronomy,*
Michigan State University, East Lansing, MI 48824, USA

Motivation

- "Kink" in charge radii indicate a shell closure
- Because of the soft nature of ^{56}Ni, it is important to extend the charge radii measurements of neighboring elements across *N*=28

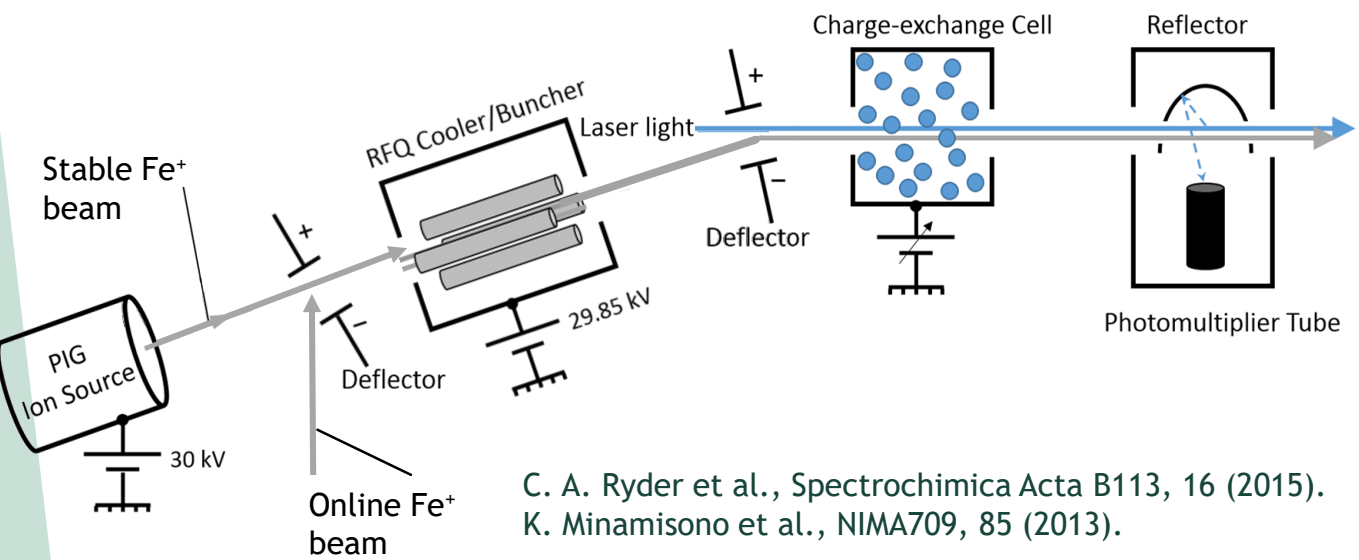


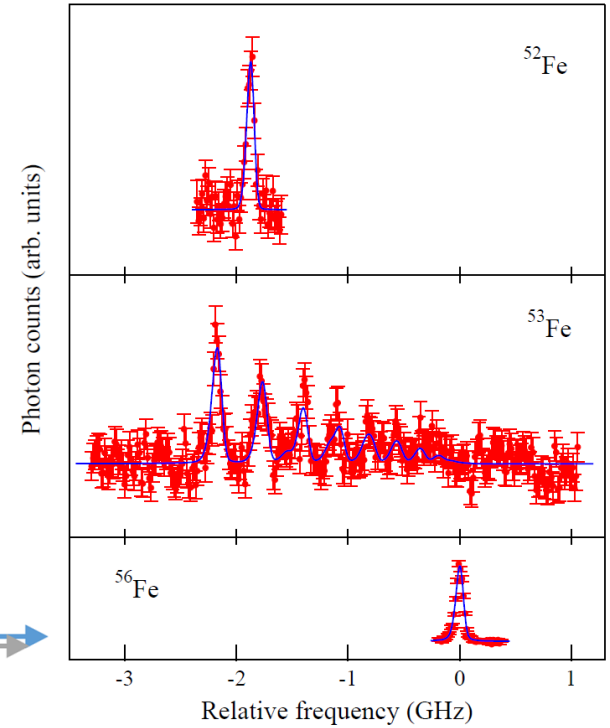
AME 2012



Collinear Laser Spectroscopy (CLS)

- Using CLS, the charge radius can be extracted from the isotope shift of the hyperfine spectrum
- The isotope shift of ^{52}Fe and ^{53}Fe were measured for the first time

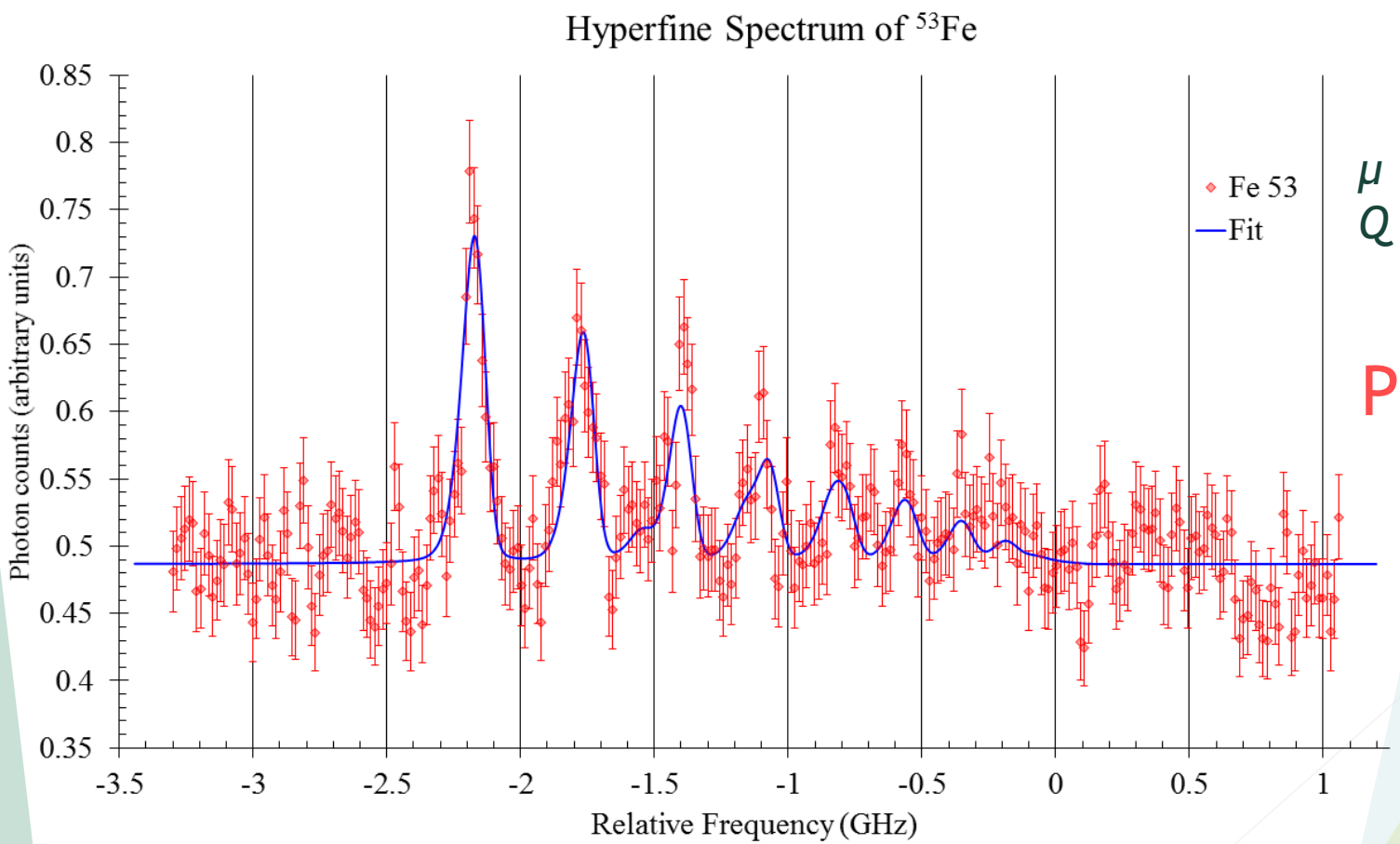




C. A. Ryder et al., Spectrochimica Acta B113, 16 (2015).
K. Minamisono et al., NIMA709, 85 (2013).

Results

- The nuclear magnetic moment and quadrupole moment of ^{53}Fe were extracted from the hyperfine spectrum

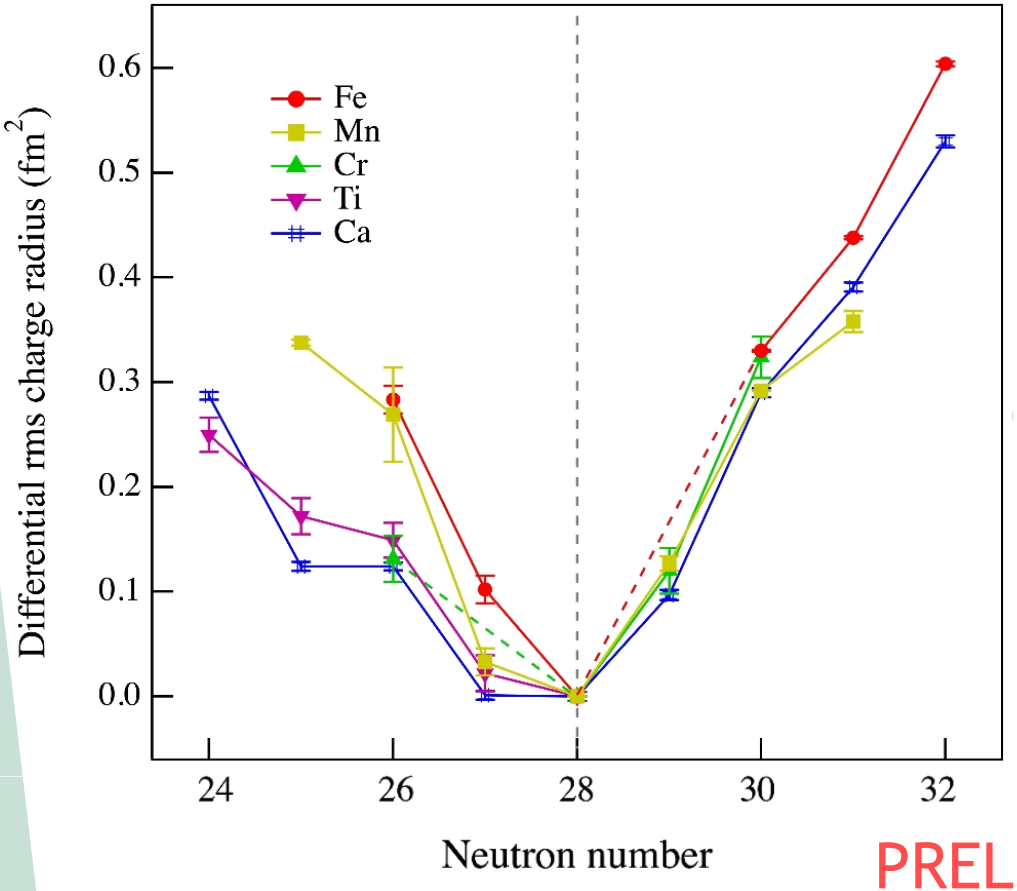


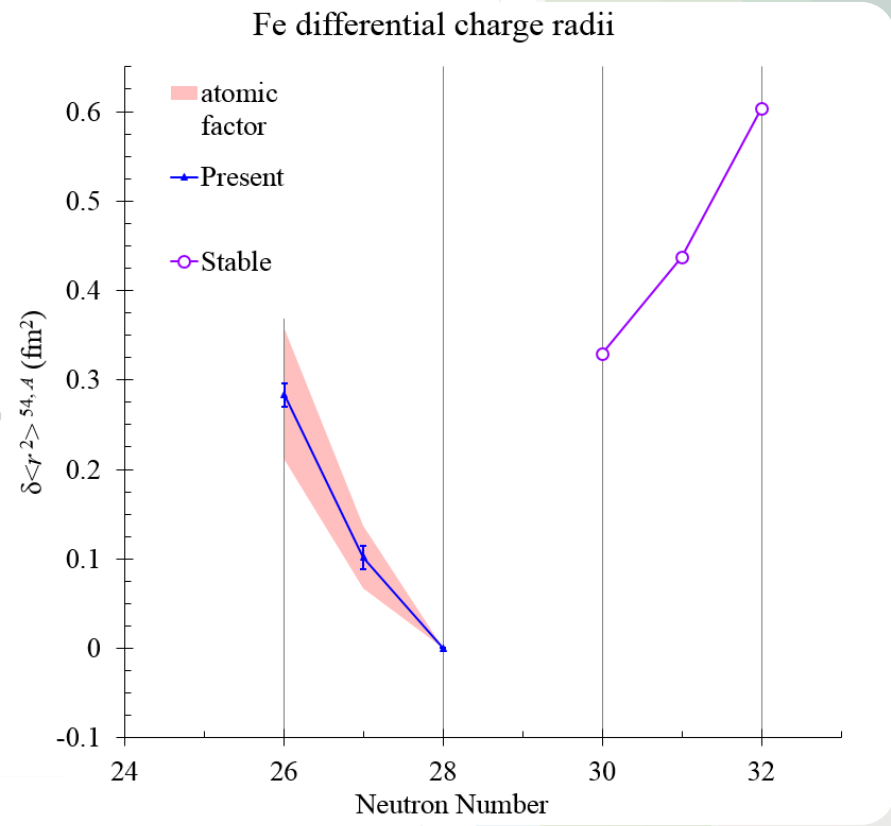
μ (μ_B) = -0.65±0.01
Q (e^2fm^2) = 35±15

PRELIMINARY

Results

- Clear shell closure signature is present in the charge radii of Fe at *N*=28





PRELIMINARY

Thank you!

- Collaborators:

K. Minamisono[1,2], D. M. Rossi[3], R. Beerwerth[4], B. A. Brown[1,2], S. Fritzsche[4], D. Garand[1], A. Klose[5], Y. Liu[6], B. Maaß[3], P. F. Mantica[1,7], P. Müller[8], W. Nazarewicz[9,2], W. Nörterhäuser[3], E. Olsen[1,2], M. R. Pearson[10], C. Sumithrarachchi[1]

[1]National Superconducting Cyclotron Laboratory, MSU, East Lansing, MI 48824, USA
[2]Department of Physics and Astronomy, MSU, East Lansing, MI 48824, USA
[3]Technische Universität Darmstadt, 64289 Darmstadt, Germany
[4]Helmholtz Institute Jena, Jena 07743, Germany
[5]Department of Chemistry, Augustana University, Sioux Falls, SD 57197, USA
[6]Physics Division, Oak Ridge National Laboratory, Oak Ridge, TN 37831, USA
[7]Department of Chemistry, MSU, East Lansing, MI 48824, USA
[8]Physics Division, Argonne National Laboratory, Argonne, IL 60439, USA
[9]Facility for Rare Isotope Beams, MSU, East Lansing, MI 48824, USA
[10]TRIUMF, Vancouver, BC, Canada

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