A Panorama of PAN

ChimPANzees

Renee Lince[1], Jon Liu[2], Austin West[3]
1 Bath High School, Bath, MI, USA.
2 Lowndes High School, Valdosta, GA, USA.
3 Bullock Creek High School, Midland, MI, USA.

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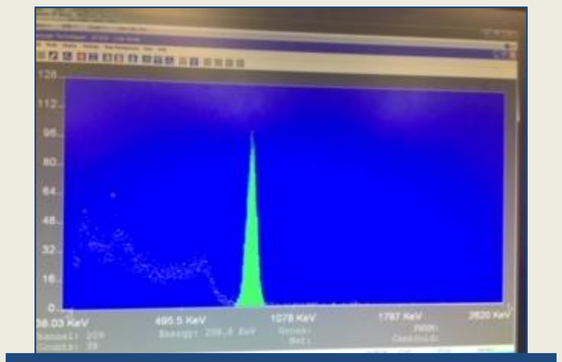
Experiment 1 - Gamma Spectroscopy

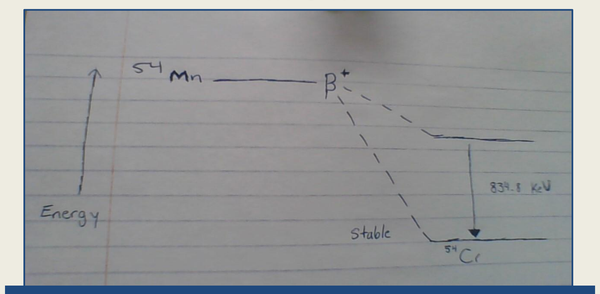
Researching in the laboratory

In the first experiment, we were tasked with identifying an "unknown" radioactive isotope by evaluating its gamma ray emissions.



A gamma ray spectrum of Mn-54

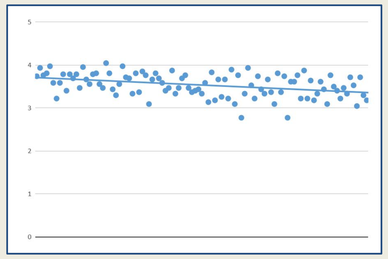
We examined the peak energy and compared it with a known database to determine the element to be Mn-54.



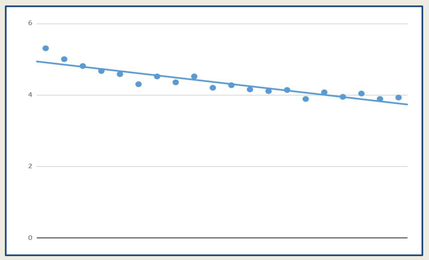
A beta-decay scheme for Mn-54

Experiment 2 - Detecting Half-lives

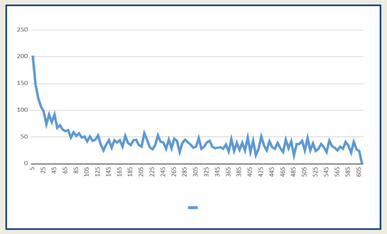
The second experiment involved detecting radiation to determine the half-life of Ag-108 and Ag-110. A Geiger Muller tube was used to measure radioactivity from a neutron-enriched silver dollar. The data was plotted into Excel to determine the half-life (slope) of each isotope.

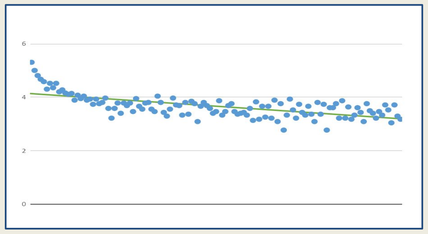


Ag-108 half-life



Ag-110 half-life





Ag-110, Ag-108 energy levels

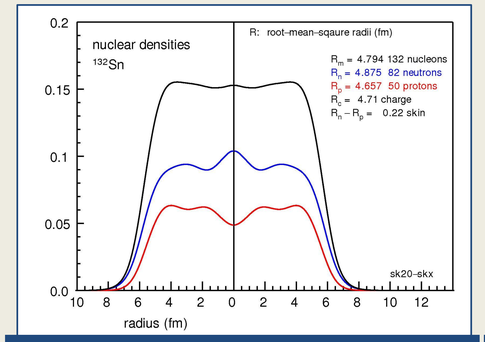
The half-lives calculated experimentally had a marginal error, possibly due to isolating the data from background radiation. The actual half-lives are Ag-108: 2.38 min; Ag-110: 24.6 seconds.

Neutron Capture Activity

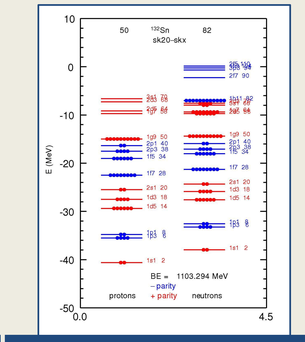
By simulating the r-process and s-process of neutron capture, we mapped some of the isotopes that could not be created in fusion.

Experiment 3 - Quantum Physics with EDF Theory

EDF Theory was developed to describe the structure of nuclei. A model calculation analyzed the element and mass number to develop a nuclear density and nucleon configuration chart. The data was then compared to an interactive chart of the nuclides database to determine the difference between a lab-produced model and a scientific comparative source.

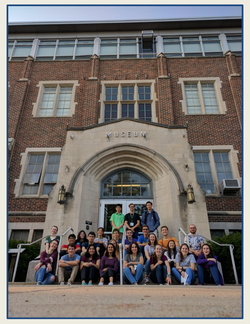


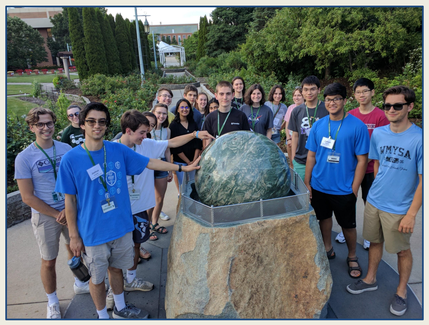
Nuclear density of Sn-132



Single particle energies of Sn-132

Evening activities





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