4-20-2011

The Effect of Strong Electrostatic and Magnetostatic Fields on the Activity of Radioactive Nuclides

Sam Schaub
Valparaiso University, sam.schaub@valpo.edu

The Effect of Strong Electrostatic and Magnetostatic Fields on the Activity of Radioactive Nuclides

Samuel Schaub

Departmental Affiliation: Physics and Astronomy
College of Arts and Sciences

This experiment seeks to measure the effect of strong electrostatic and magnetostatic fields on the decay constant of short-lived radioactive isotopes. Though it is assumed in modern radioactivity theory that such fields should not have any measurable effect, conclusive evidence utilizing modern equipment is absent from published literature. Samples have been monitored that exhibit beta-minus, beta-plus, electron capture, and internal conversion modes of radioactive decay. Radioactive nuclides chosen for this study include I-128, Cs-134, and Cu-64. The half-lives in this collection of radioactive nuclides range from 25 minutes to 12.7 hours. Sodium Iodide detectors are used to monitor the samples both before and after they are placed in a strong static electric or magnetic field. Electric fields used in this study are about 20kV/cm and magnetic fields are inhomogeneous between 4.5kGauss and 7.5kGauss. From the data collected, the half-life of the sample during the time in the field is calculated, and this is compared to the normal half-life in the absence of strong electric or magnetic fields. This experiment is looking for very small deviations in the half-lives that escaped detection in earlier experiments that used cruder equipment.

Information about the Author:
Samuel Schaub is a senior physics and chemistry major. Next fall, he will begin pursuing a Ph.D. in plasma and fusion physics.

Faculty Sponsor: Dr. Shirvel Stanislaus

Student Contact: sam.schaub@valpo.edu