

Physics Department Senior Design Project Proposal

Project Mentor: Uwe Greife, 303-273-3618, ugreife@mines.edu
(Name, phone, email)

Project Title: Construction and Test of Activation Setup for the Measurement of Nuclear Reactions

Project Type: [] Team; Number of students ___ 1-3 ___ [] Honors

Objective

(What is the science and/or engineering in this project?)

The nuclear group wants to operate an activation setup at its 180 kV ion accelerator. Here nuclear reactions produce a radioactive product nucleus, which is moved periodically out of the ion beam in front of an appropriate detection setup. Through the decay of the products the probability for the initial reaction can be inferred. This project requires knowledge of vacuum technology and radiation detection as well as hands-on laboratory skills. An existing vacuum chamber setup will be finished and tested. After that a setup using available gamma detectors will be designed, built and tested.

Prior Background

(What is the history of your involvement with this topic, including previous student projects?)

This is a continuation of a previous senior design project.

Student Expectations

(What are the deliverables (in addition to the lab notebook and reports) for the two-semester project?)

Functioning vacuum and detector system. Offline tests with radioactive sources.

Supervision Plan

(Who will be directly interacting with the student(s), you, a post-doc, grad students, or others?)

Uwe Greife (primary contact, available for help as needed)

Resources

(What equipment, algorithms, and facilities are available, and what will be assembled as part of the project?)

All commercial hardware and software is available. Several vacuum pieces will need to be produced in our workshop.

Technical References

(Identify a few key starting points for the student(s); journal citations, prior reports, instruction manuals, etc.)

Previous senior design materials and reports.

http://prola.aps.org/abstract/PR/v98/i5/p1237_1