

Physics Department Senior Design Project Proposal

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

Project Title: Measurement of Beta Emitters with Plastic Scintillator and Wavelength Shifting Fiber Readout

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

Objective

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

We want to try out if we can readout a plastic scintillator detector via several meter long WLS fiber readout when it is excited by a radioactive betas source. A possible application is in an environment where electronics can only be used at a certain distance to the source of radiation. This project requires hands-on laboratory skills to build this test setup for a possible detector approach to nuclear diagnostics at the National Ignition Facility (NIF).

Prior Background

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

This is a new project but the group has experience with building detectors.

Student Expectations

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

Functioning vacuum and detector system. 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), Postdoc (detector manufacturing 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 and detector 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.)

Knoll: Radiation Detection and Measurement

http://pos.sissa.it/archive/conferences/051/010/PD07_010.pdf