

Accelerator Physicist

Job Description

-The accelerator physicists at the SNS use computational modeling to study the atomic particles moving through the accelerator and determine how it could run better. They also troubleshoot when the particles are not moving the way they are supposed to.

Education

-PHD in physics

Approximate Salary Range

-The approximate salary range for an accelerator physicist is about \$90,000-\$200,000

What can I do now to prepare?

-Enroll in physics classes in high school and work hard in those classes to gain foundational knowledge of physics.

-Learn about atomic particles and the basic elements

-Look at universities that have a physics bachelor's and PHD program and determine what steps you need to take in order to be accepted into those programs

Career Spotlight:



Kiersten Ruisard: Accelerator Physicist

Accelerator Physicists at the Spallation Neutron Source help the accelerator run better by understanding how the particle/ion beam moves through the accelerator. They use computational modeling of the ion beam motion on computer software, as well as instrumentation at the SNS to measure the ion beam and figure out how the particles are moving. The physicists then use the data from the software to solve current problems and to predict what could happen in the future in order to troubleshoot problems before they occur. The accelerator physicists at the SNS also collaborate with colleges from other accelerator facilities and share findings with them to further advancements in accelerator physics not solely at SNS, but worldwide. Kiersten Ruisard works as an accelerator physicist on the linear accelerator section of the SNS. Kiersten began her journey by obtaining a bachelor's degree in physics. While working on her degree, she was introduced to a small accelerator and determined that that was the path she wanted to take. She continued her education to complete a PHD in Physics and gained much experience in the field through her graduate program. After graduate school, she came to the SNS and began working as an accelerator physicist. In addition to extensive education in physics, Kiersten mentions the importance of being able to get to know and get along with people in this career. As with most jobs at SNS, employees work with many other teams with different specialties in order to help the facility run smoothly, so being able to talk to people is important.

Interview: Kiersten Ruisard:

- What is your job title?

Accelerator Physicist

- Describe your job as if you were talking to a middle schooler.
- I work on our particle accelerator, specializing on the accelerator itself and how it works. I work on making the accelerator function properly and if there are issues with how it is running, I work to solve those problems.
- Our students will build a model of the injection region of the SNS. Did you have any role in any of the equipment (design/operation/maintaining/ control) in the injection region shown in model? Can you explain that role?

I work on the linear portion of the accelerator. This is everything up to the injection region. I try to understand how the particles are moving in the accelerator and how to help them move more efficiently. I use computer software to model the movement of the particles and track where they end up in order to solve issues within the accelerator. One problem is that sometimes the particles may scrape off and move away from the center and get lost which can cause radiation, I work to understand when that may happen in order to stop it from happening. We use beam loss monitors in order to track the particles and determine if there is some type of issue.

- What qualifications or education did you need in order to be hired for your position?

PHD in Physics (BS in physics)

PHD in engineering would also get you into a graduate program in accelerator physics

- Did you have any other jobs before this one that led you to your position?

This is my first official job but I got work experience through my PHD graduate program.

- Are there any other types of jobs that work in your field that are on your team or that you work closely with?

Operations- the people running the accelerator

Instrumentation group- Help determine how to actually measure what is going on in the accelerator.

- When did you become interested in perusing a job in this field?

I liked the physics class I took in high school and decided to pursue physics in college. Then while I was in college, I was introduced to a small particle accelerator in a lab class that I took interest in and that led me to this field.

- What does a typical work day look like for you?

A lot of computer work to do computational modeling and interphase to the particle accelerator itself in order to do experiments. I go back and forth a lot from my office to the control room. Some things we can only access from the control room and sometimes I may need support from the operators of the accelerator when working on an experiment.

- What aspects of your job do you enjoy the most?

Collaborating with others and traveling to conferences to work together to solve problems and share experiences.

- What tools or technology do you use most in your job?

Computer software to track the movement of the particles and Python computer language.

- What skills do you think are essential in your job in order to be successful?

Getting along with people is a lot more important than you might think. You have to collaborate and know who does what job in order to work with them on future projects.

- Why is your job important to the Spallation Neutron Source?

We keep the accelerator running well and constantly try to learn how we can make it run even better. We also try to look at solutions to other issues with accelerators that other labs might be interested in using and share that knowledge.