Career Paths

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ONE JOURNEY

Particle and nuclear physicists: Salary, career path, job outlook, education and more

Particle and nuclear physicists study the properties of atomic and subatomic particles, such as quarks, electrons, and nuclei, and the forces that cause their interactions.

Education Required

A Ph.D. in physics, astronomy, or a related field is needed for jobs in research or academia or for independent research positions in industry.

Training Required

Many physics and astronomy Ph.D. holders who seek employment as full-time researchers begin their careers in a temporary postdoctoral research position, which typically lasts 2 to 3 years. During their postdoctoral appointment, they work with experienced scientists and continue to learn about their specialties or develop a broader understanding of related areas of research. Senior scientists may carefully supervise their initial work, but as these postdoctoral workers gain experience, they usually do more complex tasks and have greater independence in their work.

Job Outlook

The projected percent change in employment from 2016 to 2026: **14% (Faster than average)**

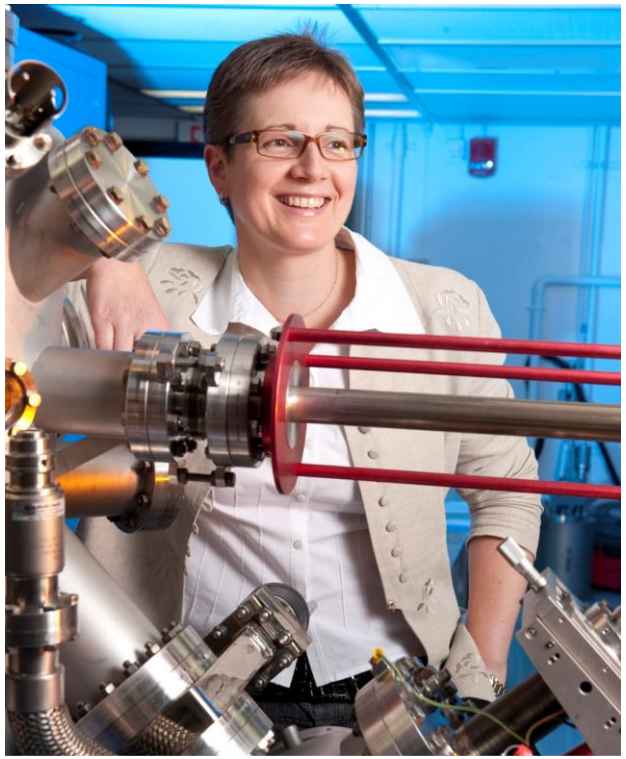
(The average growth rate for all occupations is 7 percent.)

Advancement

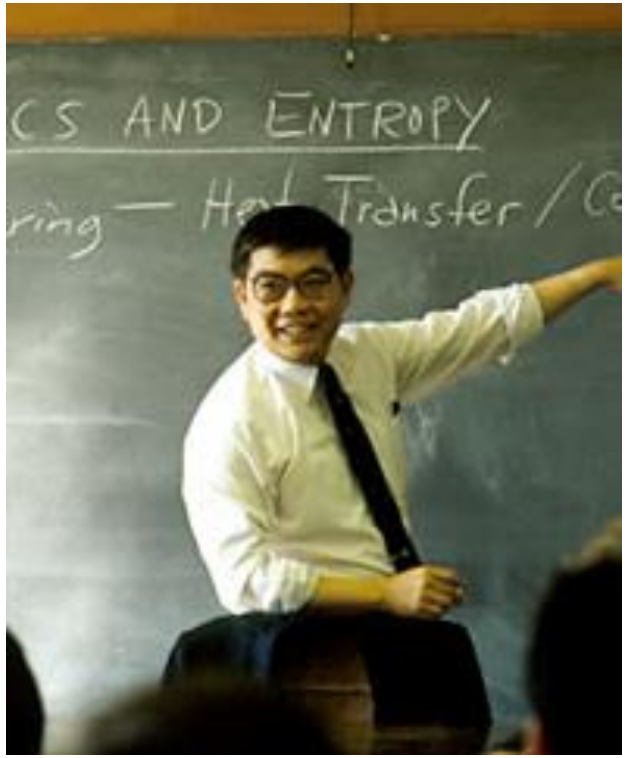
With experience, physicists and astronomers may gain greater independence in their work, as well as larger research budgets. Those in university positions may also gain tenure with more experience. Some physicists and astronomers move into managerial positions, typically as a natural sciences manager, and spend a large part of their time preparing budgets and schedules. Physicists and astronomers need a Ph.D. for most management positions.

What are my options?

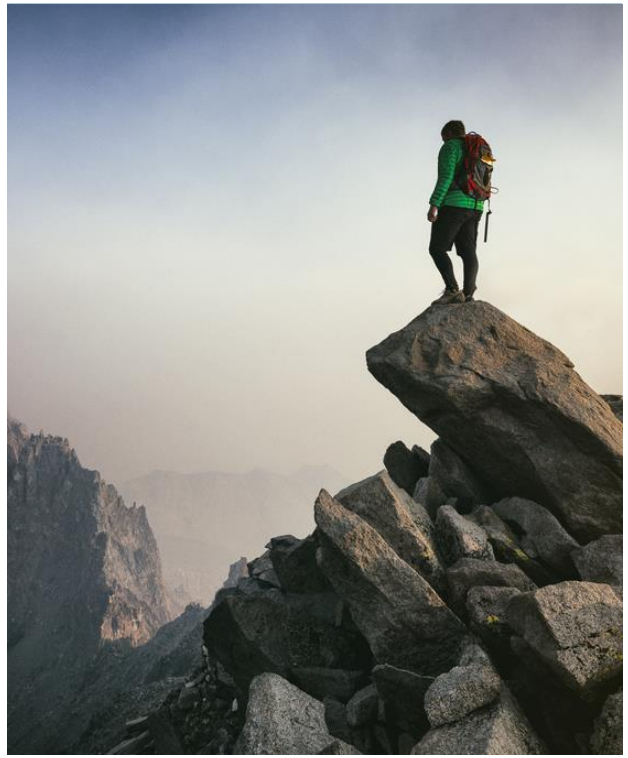
https://www.raise.me/careers/life-physical-and-social-science/physicists-and-astronomers/particle-and-nuclear-physicists/



National Lab



Academia



Industry

Which research path to follow?
or blaze a new trail?

Other options?

Nuclear Physics Jobs

Careers in nuclear physics began in the early 20th century when the nucleus and its building blocks were discovered. Jobs working with nuclear weapons and nuclear power plants exist, but there are many other applicable of nuclear physics jobs. In hospitals, medical physicists work in nuclear medicine and magnetic resonance imaging. Particle therapy is a form of external beam radiation therapy that uses accelerators to generate beams of protons, neutrons, and other positive ions to treat cancer. Using an accelerator is clearly a position for someone with a background in nuclear physics. Accelerators are also used for implanting ions into solids, such as semiconductors, to change their properties. Another source of career opportunities is archaeology because of the use of radiocarbon dating. Research in fusion and the creation of heavy elements also provides career opportunities for nuclear physicists.

An indication of the large number of nuclear physics jobs is the size of the American Nuclear Society, which is a not-for-profit, international, scientific, and educational organization. Its membership consists of 11,000 engineers, scientists, administrators, and educators with jobs at over 1,600 corporations, educational institutions, and government agencies in the field of nuclear science and technology. It publishes *Fusion Science and Technology, Nuclear Science and Engineering, and Nuclear Technology*. The organization has over 20 separate professional divisions from "Accelerator Applications" to "Materials Science and Technology" to "Aerospace Nuclear Science and Technology," indicating the wide range of career opportunities for nuclear physicists.

The Fermi National Accelerator Laboratory is affiliated with the University of Chicago and many other organizations and operates the second largest high-energy particle accelerator in the world (CERN has the largest). While high-energy physics is associated with particle physics, rather than nuclear physics, there are many career opportunities for scientists experienced in accelerator-related technologies. Another source of jobs is the Lawrence Livermore National Laboratory (LLNL), which has an annual budget of about $1.5 billion and employs thousands of people. According to its mission statement, LLNL is dedicated to the "safety, security, and reliability of the U. S. nuclear deterrent," reducing threats to "national and global security," and enhancing the "energy and environmental security of the nation."

https://www.aip.org/jobs/profiles/nuclear-physics-jobs

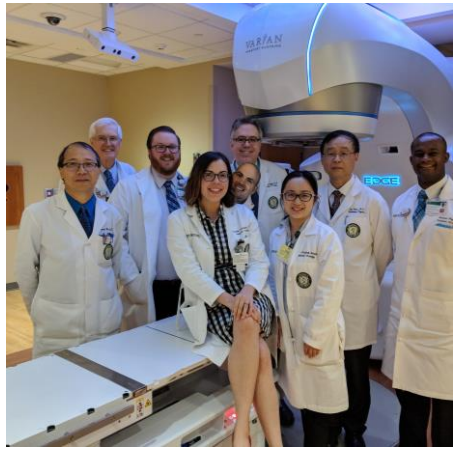
Any degree in physics opens paths

Ph.D. ROADS

Paths my colleagues found

PLUS: Wall Street, Data Science, Engineering, Computer programming, and more

Patent Lawyer



Medicine

Gov't Policy

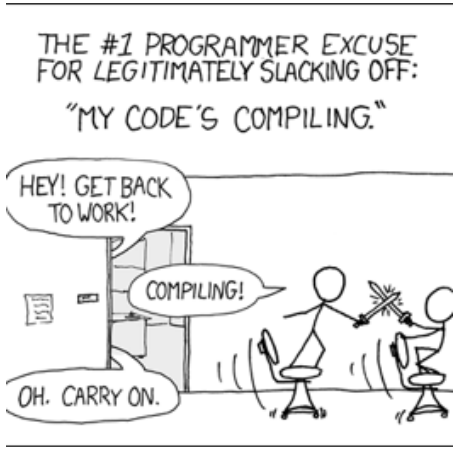
Journal Editor

Make new ROADS

Side gigs can also turn into careers

with or without PhD

Communication



Comics

Poker

Startups

Skills gained

- Computer Programming
- Data Analysis
- Design
- Hardware
- Technical Writing
- Teaching

...

Opportunities taken

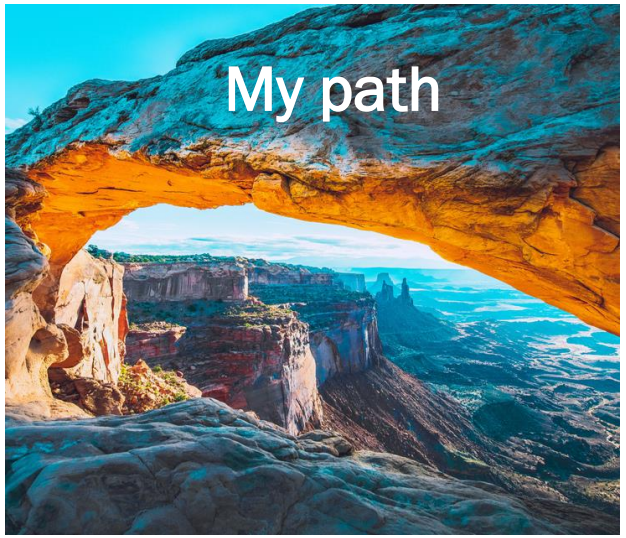
- Committees
- Outreach
- Tutoring
- Publishing
- Grant writing
- Extracurriculars

...

People met

Are the most important
They open doors and show you where to find new ones

These determine which paths open
+ LUCK



JINA Outreach

(soft money)
2011-2020

Diversity Research & Consulting

Analyzing data
without grant writing
or publishing

(no money)
2012-present

MSTCi & Science Café

Community
involvement and
politics

(no money)
2012-2019

Teaching

... for experience

(no money @ ND)
2015-2018
(one year @ HCC)
2015

Director Regional Science Fair, Warrior Scholars

Campus involvement

(stipends)
2016-2019
2018-19

Crossroads

Grant Administration
Consultant
APS
Museums
Data Science
Faculty

Teaching

... as career

(firm money @ ND)
2019-2020
(firm money @ MCC)
2020-

Intellectual challenge

Independence & Flexibility

Work-Life balance

the ultimate **CHOICE**

Societal Impact

depends upon your values

Prestige

Money

Location