Have Ph.D.
Will work for Money

A brief personal overview of working in industry with a Ph.D. in Physics

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Leaving Academia

At this point, many of you have spent nearly a decade studying physics and some of you may be considering or have decided not to pursue a career in academia.

Questions:

- Should I leave academic physics?
- Why do I want to leave academic physics?

These are questions with very personal answers and you have to sort them out before you go out there and seek jobs. They will come up often in your job search and you will be asked to give reasonable answers.

Points to note:

- Leaving academia may not mean leaving physics.
- Intellectual challenges may be found in many real-world problems.

What is Industry?

A sampling of employers with job listings under industry on the *Physics Today* Jobs website.

- *Applied Materials:* Manufacturer of semiconductor fabrication and testing equipment.
- *J.P. Morgan Chase:* Premier investment/commercial bank.
- *Spin Transfer Technologies:* A startup company using nanotechnology to build a new type of memory chip.

These are just examples of the variety of places you may end up working at. Each company is different in its requirements, hiring processes, etc. The process of searching for jobs in industry will necessarily be far more varied especially if you are not sure what kind of job you are looking for.

There is a world of options out there and you should be able to find something which challenges and fulfills you.

Types of Jobs that Physicists may do in Industry

- **Industrial R&D**: There is a wide range of these jobs which can range from almost pure research to pure engineering. Typically these jobs will require an experimental physics background but may not necessarily be in your area of research. *Eg Intel, AMD, IBM, Cree, Sony, Lucent, etc.*

- **Software**: Programmers are needed in a wide variety of fields. A good working knowledge of a modern programming language such as C/C++, Java, Perl, Python is the biggest prerequisite. *Eg IBM, NetApps, etc*

- **Consulting**: Working for a big consulting firm as a management consultant. May need to get an MBA to go this route, though it is not necessary. *Eg McKinsy, Booz Allen Hamilton, etc*

- **Technical Analyst**: Many companies are looking for people with good quantitative skills who can apply them to real world problems. Again a good programming and numerical background is required.

- **Quantitative Finance**: A specific example of the previous type of job is the "Quant" on Wall Street. These jobs range a wide variety of topics from derivative pricing, developing trading strategies, risk management, etc.

More Jobs that Physicists may do in Industry

- **Technical writing/editing**: If you enjoy writing, then this may be a very good option for you. Avenues includes science journalism, Journal editing, manual writing, etc.

- **Patent Law/Evaluation:** Needs a JD usually, but you can become a patent examiner without one.

- **Entrepreneurs:** Start your own company. If you intend to use some work which you did during your Ph.D., make sure that you talk to the University's IP office.

Does a Ph.D. help me? Or hurt me?

Pros

- You have shown that you are academically strong.
- You can do research work.
- You have acquired specific skills which may be directly applicable to a particular job.
- You have acquired a wide variety of *soft skills* (which may not be directly applicable to any particular job) but make you a good candidate for jobs which require analytical thinking.

Cons

- You may be over-qualified for certain jobs.
- You may be/appear to be over-specialized.
- Poor attitude/ inadequate preparation due to lack of knowledge of the industry. This may be a problem both at the resume and the interview stage.
- No network amongst industry professionals. Usually required to get your “dream” job.
- People who do not have a Ph.D. tend to box you according to what they perceive you to be best at. May not be what you want.

The process of looking for a job

Once you have decided to look for an industry job, the steps you have to follow are:

1. Search for jobs for which you fit the criteria and narrow down a subset you are willing to apply for.
2. Prepare a resume which targets the job and send it along to the company. Do some research on the industry group and company at this point to understand what the job may entail. See if you know someone personally at that company. Rarely does HR pass on the resume to the hiring manager.
3. Get an interview call or if not, follow up to see if there was any interest in the resume.
4. Learn from steps 2 and 3. Go back to step 1 and repeat until you have a job.

Where to look for jobs?

There are many resources you can use to search for jobs.

- **Job Ads**: Look at advertised jobs in Physics Today, job search websites such as Monster and also other sites such as Craig's List.
- **Networking**: Tell everyone (that means everyone) you know that you are looking for a job. Join a networking site such as LinkedIn.
- **Recruiters**: You can send your resume to recruiters and have them help you look for a job. Most recruiters will charge employers, so you should not have to pay them.
- **Read** about the industries/companies you are interested in and see if there may be some role you can envision yourself in. A newspaper article which mentions that Microsoft is hiring people to improve the physics simulation of their video game engine may suggest an opportunity.

Resume

Writing a good, professional resume is the key to getting the attention of your potential employer. Some of the points you should remember as you work on your resume are:

- A resume is not a CV. You should list your research, but do not give details. Do not list publications/presentations. Make these available on demand.
- Emphasize the skills you have acquired during your Ph.D. Be very specific and spell out the actual techniques/programming languages/experimental tools you used and how you used them.
- List the projects you were involved in and detail your contributions to them.
- Keep it short (one page or less). Remember that the person who is reading it will likely spend less than a minute looking at it.
- Get other people's feedback.
- Expand/contract parts of the resume to tailor it for particular jobs.
- WSJ has good articles as to how to write a succinct resume.

Industry vs. Academia

While the daily tasks in an industry job are similar to what you might find in academia (e.g., almost everyday I do some math, write some code, read a paper or two), but there are some substantial differences. Some of the ones which I found were:

- Shorter, firmer deadlines
- Higher stress, especially in Finance when you lose money.
- Greater diversity in the intellectual levels of the people you work with.
- Typically better paid.
- Lack of job security (though this is also true in academia till you get tenure)
- Less “academic” freedom to explore topics which may interest you, but have no relevance to your job.
- Unless in R&D, you rarely publish.
- Potentially far greater amount of people time, meetings, etc.
- No “higher purpose” to your job, you are trying to help your employer make money.

Working in Startups

One of the more interesting options available to a Ph.D. in Physics,is to work for a small startup company or maybe even start one. The job in a startup may superficially look like the job in a bigger company. In fact, any of the jobs I talked about earlier may be found in a startup environment.

- Challenging projects with short timelines and make-or-break potential.
- A small group environment where new problems arise and are met everyday. Very similar to being part of research group in this aspect.
- Opportunity to get your hands dirty in several areas and build your skill set.
- High risks, but potentially high rewards as well.
- Real sense of accomplishment at having built something new if you succeed.
- Typically higher stress than other opportunities, but more creative potential.
- Learn about real business decisions from a very early stage.

Summary

- Many options, but be flexible.
- Understand your skills and interests.
- Network, network, network!
- Make sure you have a clear, professional resume.
- Look for a job which you think you will enjoy. Doing it purely for money may eventually get to you.
- Remember, this is only your first job. If it does not work out, there are many other jobs out there.

Good Luck!!!