

• Tuition, fees, room & board	\$ 30,426
• Misc. supplies	\$ 10,000
Total for 4 years	\$ 55,514

We also need to consider the so-called “opportunity cost” – how much you would have earned if you were to enter the workforce right out of high school. Being a bright and eager person, you might command as much as \$10 per hour – in a climate where the US minimum wage is \$7.25/hr, and the highest state minimum is \$8.55 in Washington. Assuming a 40 hour work week, your gross income would be \$20,800 in the first year. With a 5% raise each year, your total gross income would be \$89,650 for the four years you would – and should – have been studying physics. Against this, there would be taxes (we’ll estimate 20% of income for federal, state & local) and living expenses. To maintain equivalence with the student living at home at no cost for two years, we’ll assume you will live at home for two years at no cost, but then have to pay the equivalent of the room and board expense - \$8,193 per year according to “Trends in College Pricing.” This reduces the earned income to \$55,334. The real total cost of your four year education would be \$110,848.

Neglecting for the moment the fact that you will be working in a field you find interesting and challenging, you have attained a threshold that offers upward mobility, with an average annual starting income of \$51,000^v. This is at a time when your annual income would have been about \$24,000 as a high school graduate. The question then becomes how long it would take you to “break even?” Neglecting income taxes and raises the \$27,000 per year differential means your “Return On Investment” (ROI) would be about four years – quite possibly less because

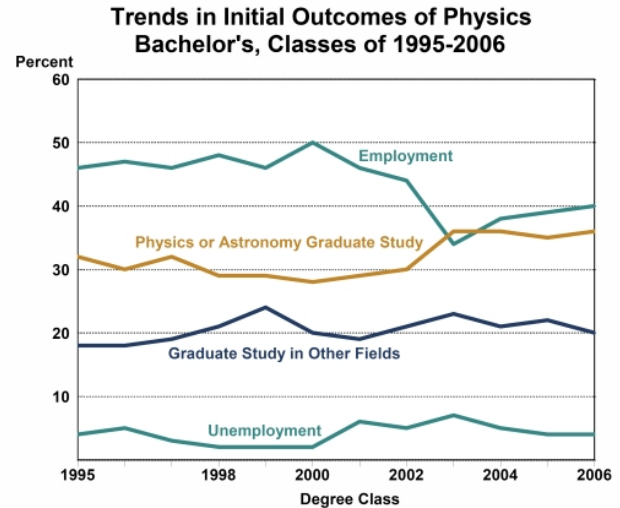
- raises are likely to be larger and more frequent as a graduate physicist,
- we haven’t considered income from summer or part-time jobs, possibly at higher pay than a high school graduate, nor
- financial assistance in the form of scholarships and assistantships.

It is appropriate to comment that this low cost approach to a physics education does not mean that it is inferior. One can argue that a good student will succeed at any school and that any differences in resources between this and an Ivy League school could easily be offset by your learning to be self reliant, focused and dedicated. A survey of physicists 5 years after earning their B.S. shows that size or type of the physics department has no effect on their obtaining a career path job; their working in a Science, Technology, Engineering or Math job; the number of interviews, time spent looking for or number of offers for a first job; their perception that a physics degree helped them get a first career path job; the number of college or university resources used to find their first career path job; and the first salary offer when controlled for type of job, experience, degree, and gender.^{vi}

Graduate School

Once you have a B.S. degree, the doors to many professions are open; your undergraduate training is good preparation to advanced training in many fields. Physicists often have productive careers in engineering, medicine, the law, business, finance, or related sciences such as math or chemistry for example. In fact, most Physics bachelors go on to graduate or professional school. So there are many options, including continued graduate training in Physics. Let's consider some of them briefly.

- Graduate school in Physics, leading to a M.S. or Ph.D. can qualify you for a career in academia, government or industry. As your career and interests develop you can work in pure and applied research, policy development (government and industry), management (government and industry), and education processes for example. It is often surprising to learn that advanced degrees in Physics can be earned at almost no cost, thanks to a variety of teaching and/or research assistantships. They reimburse tuition and fees, provide a stipend to offset modest living expenses, and are a valuable part of a graduate learning experience. Alternatively, if you work in government or industrial research, the costs of graduate school can be underwritten by your employer's tuition reimbursement benefits program.
- If you are interested in furthering your education – and value – for an industrial career, new Professional Master in Physics degree programs are being offered at many Universities^{vii}. This, perhaps combined with a MBA would provide a powerful educational background for an industrial career. You should know that many companies have tuition reimbursement programs, so this portion of your graduate education can cost you nothing.
- You can pursue a medical career by earning a M.D. and be involved in patient care and/or research. In addition, training in physics is valuable in medical radiology. More information can be obtained from the American Association of Physicists in Medicine^{viii}.



AIP Statistical Research Center, Initial Employment Survey

An investment in a physics education can be one of those rare instances where the financial return is fast – about four years for a bachelor's degree – and will continue to pay off at an increasing rate throughout your professional career. The only limitation to a financially secure and fulfilling career is the energy and time you are willing to devote to it – and that is a lot easier if you really enjoy what you are doing.

References:

ⁱ US Bureau of Labor Statistics, 2006

http://en.wikipedia.org/wiki/Educational_attainment_in_the_United_States#Income

ⁱⁱ American Institute of Physics salary class of 2006 <http://www.aip.org/statistics/trends/highlite/emp4/emphigh.pdf>

ⁱⁱⁱ Students Review, 2009 http://www.studentsreview.com/unemployment_by_major.php3

^{iv} “Trends in College Pricing “ The College Board, <http://www.collegeboard.com/html/trends/?excmid=MTG1-PR-1-pr>

^v American Institute of Physics; <http://www.aip.org/statistics/trends/reports/fall09a.pdf>

^{vi} “Does it Matter Where I Go To College” by R.Ivie and K.Nies, AIP Pub. Number R-433.03, available at:

<http://www.aip.org/professionalmasters/mstphys.pdf>

^{vii} “Mastering Physics for Non-Academic Careers”, by S.P.Morton, P.W.Hammer and R.Czujko, available at:

<http://www.aip.org/professionalmasters/mstphys.pdf>

^{viii} AAPM website: <http://www.aapm.org/>