Professional Master of Science in Physics

Online Information Session
October 28, 2020

UW Physics Department
UW Professional & Continuing Education

Website:  http://www.physicsmasters.uw.edu
Today’s info session

• Professor Jeffrey Wilkes, UW Department of Physics

Special thanks to

• Jim Grossnickle, Boeing Research and Technology; ... and the Boeing Company

Further information is available on our website, www.physicsmasters.uw.edu
UW Professional MS in Physics Program

Agenda

• The Professional MS in Physics (PMSP) degree program at UW
• PMSP Admission and Degree Requirements
• Partnership between UW Physics and UW Professional & Continuing Education (PCE)
• Questions & Discussion
UW Physics Department

• Offers BS, Professional MS, and PhD programs
  • But there is no full-time/daytime MS program

• Faculty
  – UW Physics faculty recognized internationally as leaders in theoretical and experimental research
    • Two Nobel prize winners (H. Dehmelt, D. Thouless)
  – Students can participate in leading-edge research conducted by faculty, and learn about the latest scientific discoveries
MS-Physics Program (MSP)

• Started in 1970s – program upgraded in 2009
  – Students come from many sources:
    • Employees of regional high-tech firms
    • High school teachers
    • Military personnel
    • Recent BS graduates

• Program designed for working professionals
  – All evening classes
  – Majority of students enroll in one course per quarter
  – Typically 2-3 years to complete degree program
Designed as terminal MS degree

• Growing demand for Professional Science Master’s degrees in STEM fields
  – Employers (industry, R&D labs) recognize value
  – Separate from Physics PhD program
    • Not designed as preparation for PhD studies
    • However, some MSP alumni have gone on to PhD programs at UW and elsewhere
  – All courses taught by full-time UW Physics faculty (regular and research professors)
Motivations & Results

• Student motivations
  – Professional and career advancement
  – Seek qualifications for more interesting assignments
  – Career re-direction
  – Simple intellectual interest

• Graduates succeed!
  – Promotions with current employer
  – Secure new jobs
  – Define new career paths in R&D or teaching
What is required to apply?

Not just for physics majors

• BS degree in a physical science, mathematics, or engineering
  – Not limited to applicants who majored in Physics as undergraduates
  – Not limited to students who got top grades as undergrads... (tell your friends)
  – Not limited to recent graduates—some of our students took their BS degree 5 ~ 20 years ago
Admission Requirements

• **Reasonable** grades in **relevant** courses
  – B (3.0) grade average in 300-400 level undergrad physics courses or equivalent engineering courses
    • Physical science and most engineering (EE, ME, CE, ChemE, etc.) BS programs include appropriate courses

• Statement of purpose
  – Your reasons to join the MSP
    • How the MSP will connect to your career goals
    • **NOT an essay contest**: used only for better advising

• GRE score is **not** required (or considered)
Not sure you are ready?

• Start as a Graduate Non-Matriculated (GNM) student (minimal requirements to start)
  – Take core courses to try out the program
    • See if it is a good match for your needs
  – May apply later for transfer to the MS degree program
    • Up to 12 GNM credits can be applied to the MS
  – OR take individual courses without committing to degree

• GNM is an option to expand your knowledge without committing to the degree program
FAQs

• Can I apply at any time?
  – Yes, we accept applications year-round
    • However, we strongly recommend starting in Autumn or Winter quarter, when intro-level core courses are offered

• What if my undergraduate degree is not in a physical science or engineering?
  – You need physics classes beyond the intro/100 course level, with good grades (GPA 3 or higher)
    • Most engineering programs include equivalent courses (mechanics, E&M, thermodynamics, etc.)
    • You can send your transcripts (informal, personal copy) to us for advice on your preparation
FAQs

• Should I contact you before applying?
  – Definitely! Please email emsp@uw.edu briefly describing your situation (location, previous education, goals) and we can provide pre-application advising

• What if I got my BS degree years ago?
  – Many of our students start after a decade or more in the workplace
    • Our classes are designed taking into account your need for review, especially in relevant math

• What should my personal statement include?
  – The personal statement is not an essay contest, as with some colleges!
    • We use it only for advising purposes, to make sure your stated goals and expectations match our program’s capabilities
FAQs

• Can I apply now to begin in Winter Term (January)?
  – Certainly! We process applications toward the end of each quarter.
  – You can also apply now to start next Autumn (end of Sept. 2021).
    • Starting in Autumn, you can take three core courses in sequence
  – What if work or family obligations come up and I need to take time off?
    – No problem! You can request on-leave status any time
      • MS students must be registered for credits OR be on-leave every term except summers, to maintain their status
      • GNM students only need to register for credits once per year – if you need more time off, apply for leave
    – However: the UW Graduate School requires you to complete your degree within 6 years of starting
FAQs

• Can I complete my degree from outside the Seattle area?
  – All lecture courses offer optional attendance via Zoom teleconferencing
    • Slides, audio and chat windows are recorded and can be viewed later
  – No lab courses are required for graduation
  – For your final independent study (capstone) project, you will need to find a topic that you can pursue remotely, and a faculty mentor willing to supervise you via email or videoconferencing

• I don’t really need an MS degree, I just want to learn more physics
  – Great! The GNM option is just what you need
Admissions

• For admission to the *Physics MS Degree Program*, or as *GNM*, submit your application to the UW Graduate School online:

   [http://www.grad.washington.edu/admissions](http://www.grad.washington.edu/admissions)

• Applications are welcome at any time
  – *Most students start Autumn Quarter, but you may start in Winter or Spring (but not Summer) Quarter*
  – Apply for admission in the next academic quarter, or to start later

• New applications are reviewed every quarter (summer also)
  – Quarterly deadlines listed on website are the latest date we can *ensure* processing in time to start the following quarter, but applications are accepted until the end of the preceding quarter
MS Degree Requirements

1 - Complete three of the four core courses (4 credits each)
   – PHYS 543: Electromagnetic Theory
   – PHYS 441: Quantum Physics
   – PHYS 544: Applications of Electromagnetic Theory
   – PHYS 541: Applications of Quantum Physics

   Offered every year, Autumn and Winter

   Alternate years, Spring term

2 - Complete at least 18 credits in graded courses
   – MSP offers one core and one elective course per quarter
     • You may take elective courses in other departments, with prior approval

3 - Complete a final independent study project
   – Submit project report (not a formal MS thesis)
   – Oral exam on your independent study topic

4 - Accumulate at least 36 credits (courses plus independent study)
Online class attendance

• All classes meet evenings, on the UW Seattle campus

• Currently, ALL class meetings are online only
  – You can attend classes from home, work, or anywhere with an internet connection, using any common browser
    • Zoom video conferencing provides audio and video of the instructor, slides, chat window – all recorded
  – Classes are not designed as “asynchronous” - we recommend attending online in realtime, or in-person (when possible again)
    – Students who just watch the recordings rarely succeed...

• For courses with labs or other hands-on work, on-campus attendance may be required for some sessions
Covid-19 had little impact on PMSP

• The UW Seattle campus has been closed since early March – no in-person class meetings allowed
• However, since PMSP classes already offered optional online attendance, our Spring Quarter courses were not affected
• Officially, UW plans to consider re-opening for in-person classes after Winter Quarter
• Winter term, I will teach PHYS 545: Optics
  – Normally we have hands-on lab sessions for 545
  – This time, I will do demonstrations of the lab work on Zoom
Electives recently offered

- Acoustics
- Physics of Lasers
- Quantum Computing
- Nuclear physics: sources, detectors, and safety
- Physics of Renewable Energy Sources
- Radiation and Radiation Detectors
- Contemporary Optics
- Numerical Methods for Physics & Data Analysis
- Condensed Matter Physics
Customize your program with independent study courses

• Exploratory independent study courses (typically 1 or 2 credits)
  – Mentored by a Physics faculty member
  – Customize your studies to match your personal goals
  – Choose a topic of your own, select from a list of suggested topics, or work with faculty on their research program in preparation for a final project

• Final Independent Study Project (typically 8 - 18 credits)
  – Work with faculty in Physics, or professors in other departments
    • MS students typically participate in ongoing research projects with faculty and PhD students
  – Or, define your own project topic
    • Some do job-related research under faculty supervision
Choose a research area that fits your goals

UW Physics Department Research Groups

• Browse research group web pages to identify faculty members who may be mentors for independent study projects:

  Astrophysics
  Atomic Physics
  Biological Physics
  Collider Physics
  Condensed Matter Experiment
  Condensed Matter Theory
  Energy Sciences
  Gravitational Physics
  Nanoscale Physics
  Neutrino Physics
  Nuclear Experiment
  Nuclear Theory
  Particle Experiment
  Particle Theory
  Physics Education
  Precision Measurement
  Quantum Information

For complete list, see https://phys.washington.edu/research
Physics Adjunct Faculty in other departments

- See the Physics Department website for list of faculty in other departments who are *adjuncts* in Physics (can supervise Physics grad students):
  - Astronomy
  - Aeronautics and Astronautics
  - Applied Mathematics
  - Atmospheric Sciences
  - Bioengineering
  - Center for Nanotechnology
  - Chemistry
  - Earth and Space Sciences
  - Electrical Engineering
  - Materials Sciences
  - Physiology and Biophysics
  - Radiology

- We also have *Affiliate Professors* outside UW, at National Labs (PNNL, Argonne, Los Alamos), and at other institutions
Your final project

• Recruit a Physics faculty member to be your supervisor/adviser/mentor

• Schedule and enroll in independent study (PHYS 600) courses each term (typically 2~8 credits/term)

• Prepare written report to summarize project and findings
  – Typically 20–50 pp, formatted as a technical report
  – Final oral examination:
    • Presentation of project and findings (typically 30 min.)
    • Questions posed by panel of two or more faculty
    • Submit final written report
Administered jointly by Physics Department and UW PCE

• Upon successful completion, you are awarded the MS in Physics by the UW Graduate School
  – Same diploma as any full-time/daytime UW MS student
  – All academic aspects are handled by Physics faculty

• PMSP degree program is administered by UW Professional & Continuing Education (PCE):
  – Course registration is handled by UW PCE
  – PMSP is one of more than 80 graduate degree programs administered by PCE
Program costs

• PMSP is a self-supporting (not state-supported), fee-based degree program

• FOR YOU: **Free**! – via Boeing’s Learning Together Program
  – Easy to sign up and register for classes

• FYI: Tuition is currently $739/credit
  – Tuition is intended to match UW resident graduate tuition
  – Total course fees/tuition for degree program (36 credits) is about $26.6K
  – Loans are available for some students
Contact Information

Website:  www.physicsmasters.uw.edu

For questions about admissions criteria, academics, course offerings, prerequisites, the independent study component:

• **Jeffrey Wilkes**, Faculty Coordinator for PMSP
  
  emsp@uw.edu
  
  (206) 543-4232 (but email is best)

To get email notices about information meetings, upcoming application deadlines, etc. :

www.physicsmasters.uw.edu/email-signup/

For questions about program requirements, application forms and admissions process:

• **Catherine Provost**, Graduate Student Advisor
  
  (206) 543-2488
  
  cuala@uw.edu

For questions about registration and payment options:

• **Brian Cox**, Operations Manager
  
  (206) 616-5104
  
  bc26@uw.edu
Questions?

• These slides will be available later today at http://depts.washington.edu/emsp/infosessions /

• For further info please visit our website, www.physicsmasters.uw.edu
  or email emsp@uw.edu