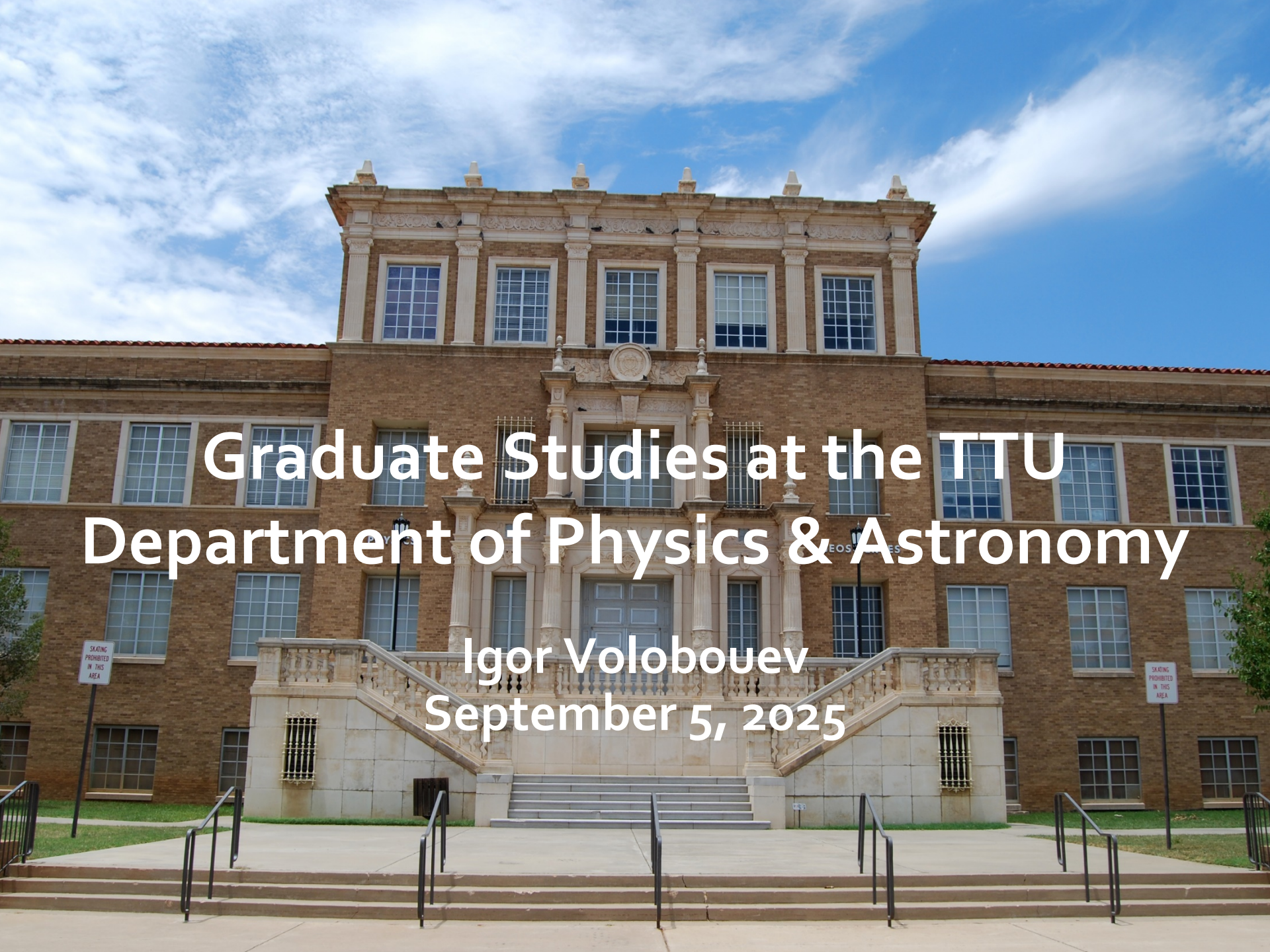


Graduate Studies at the TTU Department of Physics & Astronomy

Igor Volobouev

September 5, 2025

Welcome to the Physics Graduate Program!

- Congratulations on continuing your science career at Texas Tech!
- I will cover graduate program basics: degree requirements, courses, research, milestones, financial assistance, etc
- More details can be found in the Graduate Booklet. Check the current version of the Booklet at http://www.depts.ttu.edu/phas/Academics/

The Path to Ph.D.

- Fulfill course requirements
- Pass the Prelim Exam
- Choose your Research Advisor (normally PHAS faculty)
- Perform pilot studies and build a research plan
- Form Ph.D. advisory committee and defend your thesis proposal
- Research, research, research (also scratch your head, have eureka moments, present your findings, write papers, apply for grants and scholarships, collaborate, compete, network, become accepted in your field…)
- Find your next job
- Write and defend your thesis

- These steps are not necessarily sequential

Core Courses

- All graduate programs (M.S. and Ph.D.):
  - Classical Dynamics (Fall)
  - Quantum Mechanics I (Fall)
  - Electromagnetic Theory (Spring)
  - Statistical Physics (Spring)
- The Ph.D. program:
  - Quantum Mechanics II (Spring)
  - Advanced Electromagnetic Theory (Fall)
- Starting next year, astrophysics Ph.D. students should be able to replace QM II and Advanced E&M with
  - Radiative Processes (Spring)
  - Observational Techniques (Fall)

- TTU core course GPA must be at least 3.0 (required for both M.S. and Ph.D.)

Other Common Courses

- Seminar (required for the first three semesters)
- Tool courses (recommended):
  - Methods in Physics I
  - Computational Physics

- Finish your required coursework as soon as you can!

- Additional courses will be up to you and your Research Advisor. Overall GPA in all courses/research taken in the graduate program must be at least 3.0.
- At some point, you will likely need to enroll in thesis/ dissertation hours (required if you plan to defend M.S. thesis/Ph.D. dissertation)
- To be a full-time student at TTU, you must enroll in at least 9 credit hours per regular semester (this includes research and thesis/dissertation hours)

The Ph.D. Prelim Exam

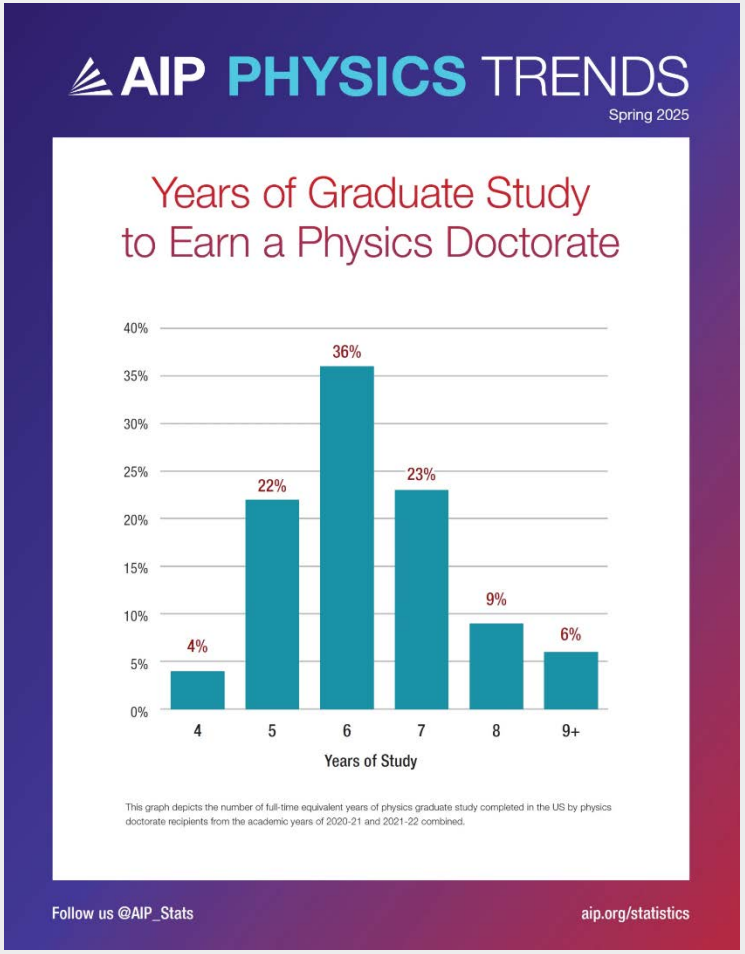
- A fairly comprehensive exam on the topics of the four core courses plus some general physics
- Consists of written and oral parts
- The outcome is the pass/fail decision made by the examination committee
- Typically offered before the start of the Fall semester
- Normally taken by the students after one year in the graduate program
- Can be retaken once if the first attempt results in a fail
- A prelim-prep course is usually offered in the Summer (taught last Summer by Profs. Huang and Sanati)

Research

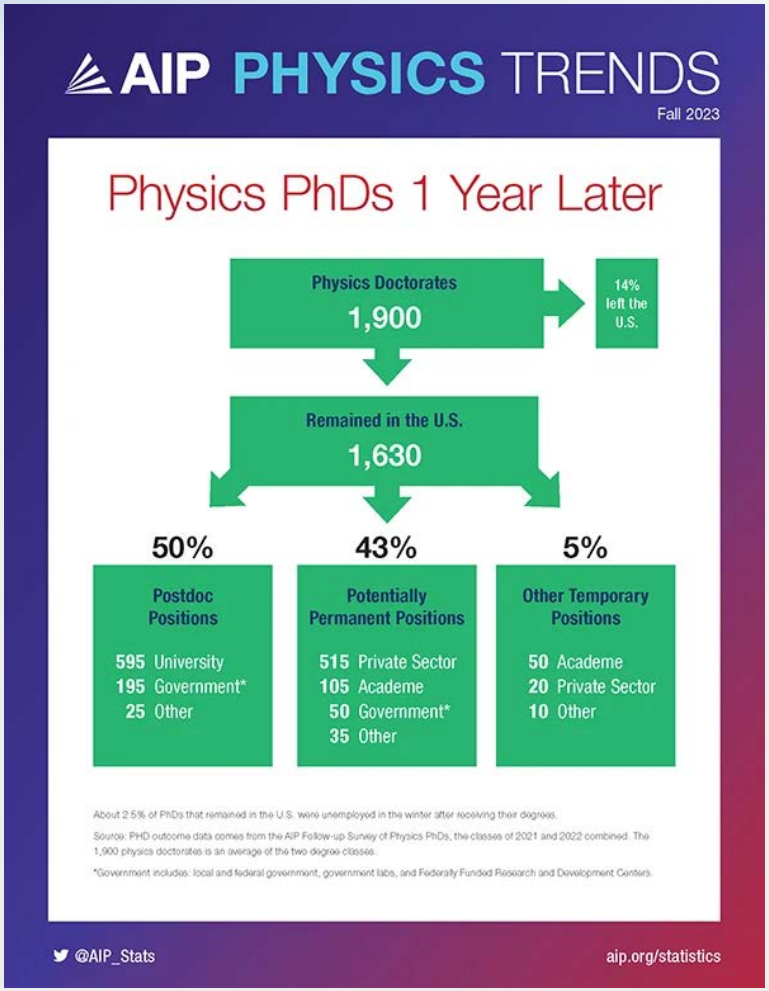
- Find a Research Advisor as soon as possible
- Think of your research not only in terms of its intellectual challenges and scientific merit but also in terms of propelling your career as a scientist
- While attaining M.S. or Ph.D. degree is your near-term goal, you should definitely look beyond that
- The book *A PhD is Not Enough!: A Guide to Survival in Science* by Peter J. Feibelman offers good advice on various aspects of research and scientific career planning

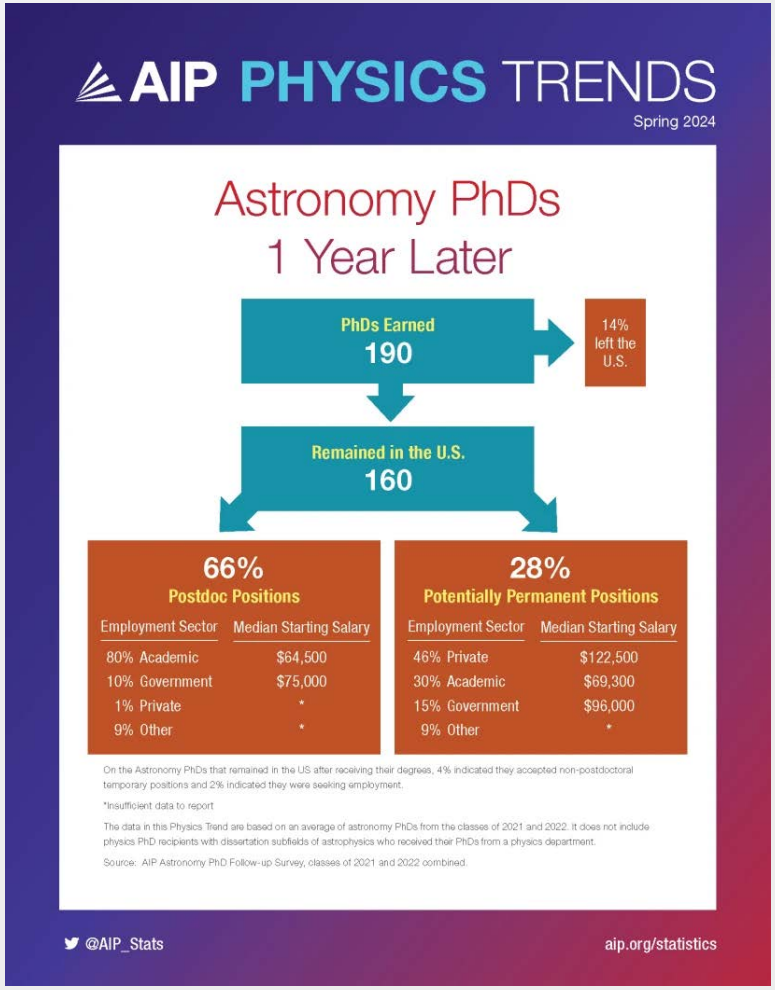
Typical Timeline

- Completion of M.S.-level core courses – one year after enrollment
- Selecting Research Advisor – one year
- Prelim Exam – one year (two years if the first attempt fails)
- Completion of Ph.D.-level core courses – two years
- M.S. degree – two years
- Thesis proposal and advancement to candidacy – three years
- Thesis defense and graduation – five to seven years



What's Next?


AIP PHYSICS TRENDS
Fall 2023
Physics PhDs 1 Year Later
Physics Doctorates
1,900
14% left the U.S.
Remained in the U.S.
1,630
50%
Postdoc Positions
595 University
195 Government*
25 Other
43%
Potentially Permanent Positions
515 Private Sector
105 Academe
50 Government*
35 Other
5%
Other Temporary Positions
50 Academe
20 Private Sector
10 Other
About 2.5% of PhDs that remained in the U.S. were unemployed in the winter after receiving their degrees.
Source: PhD outcome data comes from the AIP Follow-up Survey of Physics PhDs, the classes of 2021 and 2022 combined. The 1,900 physics doctorates is an average of the two degree classes.
*Government includes: local and federal government, government labs, and Federally Funded Research and Development Centers.
@AIP_Stats
aip.org/statistics


AIP PHYSICS TRENDS
Spring 2024
Astronomy PhDs 1 Year Later
PhDs Earned
190
14% left the U.S.
Remained in the U.S.
160
66%
Postdoc Positions
Employment Sector
Median Starting Salary
80% Academic
$64,500
10% Government
$75,000
1% Private
*
9% Other
*
28%
Potentially Permanent Positions
Employment Sector
Median Starting Salary
46% Private
$122,500
30% Academic
$69,300
15% Government
$96,000
9% Other
*
On the Astronomy PhDs that remained in the US after receiving their degrees, 4% indicated they accepted non-postdoctoral temporary positions and 2% indicated they were seeking employment.
*Insufficient data to report
The data in this Physics Trend are based on an average of astronomy PhDs from the classes of 2021 and 2022. It does not include physics PhD recipients with dissertation subfields of astrophysics who received their PhDs from a physics department.
Source: AIP Astronomy PhD Follow-up Survey, classes of 2021 and 2022 combined.
@AIP_Stats
aip.org/statistics

Financial Assistance

- TA, RA, or GPTI assistantships
- TTU fellowships and scholarships
  - TTU general fellowships (application deadline Feb 3, 2026)
  - Dissertation completion fellowship
  - Graduate student research support scholarship
  - PHAS graduate scholarships
  - Graduate school and PHAS travel funds
- External fellowships and awards
- You can apply for some of these scholarships yourself. For others, convince your Research Advisor or some other faculty to nominate you. Apply early.
- See http://www.depts.ttu.edu/gradschool/ (click on "Financial Support")

People

- Department Chair: Sung-Won Lee sungwon.lee@ttu.edu, SCI 101
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