Physics Ph.D. Qualifying Oral Examination Policy

Purpose

The Qualifying Oral Exam is an important part of the process of admission to candidacy. The exam seeks to give the student an opportunity to exhibit a broad knowledge of physics and an in-depth understanding of a particular area in order to be effective in original research. The student should exhibit command of the material, an ability to extract the essential elements of a relatively recent development in physics, and the capacity to present this material to an audience of general professionals in a way that demonstrates his or her expertise.

When

Admission to candidacy in the Physics department is normally done at or before the end of the student’s second year. It is therefore strongly recommended that you schedule the exam for Spring quarter of your second year, or earlier. In fact, a good rule of thumb is that you should consider scheduling your exam once you are in your first quarter as a member (as opposed to rotator) in an advisor’s research group. This could be during your first year, if you choose an advisor before completing three rotations.

What to do

You should identify a research topic from a field of interest to you that is also close to the forefront of current research. You cannot select something directly related to your ongoing Ph.D. research, should that have commenced – something from a related but cognate area would be more appropriate (and may prove useful in preparing you for future research down the road!) You may consult with your Research Advisor or members of Oral Qual Committee to help you select an appropriate topic. Topics of broad importance and significance, involving multiple areas of physics are preferable to highly focused and specific niches. The topic should be represented by a key research article that the student will summarize to the examination committee (including all relevant physics background to put the content of the article in context.)

It is important to keep in mind that the goal of the examinee should be to clearly understand that selected topic, and how it relates to various board subfields of physics. What is new in the advancement? What are the fundamental ideas underlying the field where advancement was made? How is this research direction likely to evolve in coming months or years?

Approval of Topic and Constitution of the Committee

Having chosen a topic, you should write a brief (not more than 1 page) description of the subject and paper(s) to be discussed, and submit it to the Qualifying Exam Committee (QEC) for approval. The examination committee for an oral exam will ordinarily consist of three faculty members. One of these will be chosen from the members of the QEC. The student can nominate up to two other faculty members when submitting his or her topic for approval; a research advisor can but need not be one of the nominees, and the student is expected to choose potential committee members for nomination based on their expertise in a broad range of topics surrounding the subject of the examination. The QEC
makes the final determination of the committee members. Ordinarily all three oral exam committee members should be faculty within the Physics department, Applied Physics, or SLAC (PPA and Photon Science). If the student’s primary advisor is a committee member and is from a department other than these, the committee should be enlarged to include at least three physics faculty members.

Details of the Examination Format

One should expect the exam to last roughly 60 minutes (no more than 120 minutes); it should be scheduled by the candidate with the committee members in consultation. The candidate should provide the topic and paper(s) to be discussed with the committee members at least 4 weeks before the scheduled exam.

The exam will consist of a talk by the candidate to the committee (with no additional observers allowed), followed by a question and answer period. The candidate should plan to talk for 45 minutes, leaving at least 15 minutes for questions. Questions may also be interspersed throughout the presentation. The candidate should be prepared to answer questions about basic physics relevant to the motivation, background, and possible extensions of the research presented. At the end of this period, the student will leave the examination room, where the exam committee (closed session) will decide whether the student has met the exam requirement.

What if I don’t pass?

In the event of failure, one is permitted to retake the examination. If failure occurs in the Spring quarter of the second year and there is not sufficient time to schedule another exam in the academic year, one can retake the exam in the Summer quarter following the second year, or the Autumn quarter of the third year. Students who need to retake the exam will need to go through the same approval procedure (of their topic and committee) through the QEC once more. In addition, the student will need to present a 7-10 page write up about the selected topic to the ad hoc committee members for review. The write up will need to be turned into the ad hoc committee members no later than 1 month prior to the 2nd exam attempt. These written notes, together with the presentation, will provide the committee with a better understanding of how the candidate is contextualizing the material in question. The quality and understanding exhibited in the notes can be taken into account by the committee in deciding whether the student passes the second exam. If the student fails the Qualifying Exam on the second try, an ad hoc committee consisting of the student’s Research Advisor and the Chair of the Graduate Studies Committee will be convened to discuss further options with the student.