

**Emory University
Graduate Program in Physics**

PhD QUALIFICATION PROCESS & QUALIFIER PROPOSAL

Introduction and Rationale

The PhD Qualification Process is designed to assess the readiness of the student for the final stage of the PhD degree program, which is the performance of original research work and the organization and presentation of that work in oral (dissertation defense) and written (dissertation) forms. The assessment is based on the Qualifier Proposal, which involves the independent preparation of a research proposal that is conceived, literature-researched, and presented in the spirit of a research proposal. Along with the stylistic aspects of organization and presentation, the strength of the Qualifier Proposal will be evaluated on the basis of whether it offers a logical and consistent approach to the chosen problem, and on the level of conviction of the committee members that the proposal offers a reasonably successful solution to the problem.

The Qualifier Proposal and associated Oral Examination aim to assess the student in the following four areas that are required for success in the final stage of the PhD program:

- (a) a general understanding of the fundamentals of physics,
- (b) the ability to think originally and creatively about a specific problem or topic, and to translate this thinking into conducting research,
- (c) scholarship (depth and scope of knowledge) in the area of research, and
- (d) the ability to organize and clearly communicate the results to the scientific community.

Specific Requirements for the Qualifier Proposal

1. The **Proposal Topic Area** will be selected by the student, typically in consultation with their PhD Advisor.
2. The specific Scientific Goal of the Proposal must address a well-defined problem in a subfield of physics. This goal will be identified by the student and should be a hypothesis, method, or exploration that is motivated by and embedded in a substantial discussion of the pertinent scientific literature. The possible outcomes of the approach and its potential impact to the existing literature, as well as the possible degrees of uncertainty in the methods, should be discussed in detail. Evidence must be provided that justifies that the proposal ideas are valid. This can take the form of referring to existing literature, calculation or coding by the student, or some preliminary data. (However, note that the student should not waste their time figuring out preliminary experiments or debugging code. Thus, justification is likely best taken from the existing literature.)
3. The **Hardcopy Written Form of the Proposal** shall be at least 25, and not more than 40, pages long (typed, double spaced; not including illustrations, figures and tables), and contain the following sections: Title, Abstract (<250 words), Introduction, Proposed Experiments (or Proposed Simulations, or Proposed Theory) and Expected Results, Discussion, Principal

Conclusions, and References. The committee will receive the written version of the Qualifier Proposal by noon at least one week prior to the oral presentation.

4. The *prepared* **Oral Presentation of the Proposal** will be a minimum of 30 and a maximum of 40 minutes in length (not including the question/answer periods during and after the presentation), and the entire examination will not exceed 90 minutes. The presentation will be closed (student and committee members only). Committee members may ask the students questions about fundamental physics concepts at any point. Following the presentation, the committee members will meet privately to decide the pass/fail outcome of the Qualifier Proposal.

5. The **Proposal Committee** shall consist of four (4) faculty members. At least three shall be members the Physics Graduate Program, one of whom should be in a research area that is different from the area of the Qualifier topic. An external faculty member may be chosen for their expertise or familiarity with the subject area of the proposal. Typically, the PhD Advisor heads the committee. Otherwise, the Director of Graduate Studies appoints one of the designated members as head of the committee. The PhD Advisor is in charge of proper execution and reporting of the examination.

6. **Timetable:** Before October 15 of the second year, the student will submit to the Director of Graduate Studies a title for the Qualifier Proposal and a brief summary (300 words) outlining the problem, hypothesis, and approach. The Director of Graduate Studies in consultation with the PhD Advisor will examine the proposal summary, and give notice to proceed with, or modify, the Qualifier Proposal by October 31st. The members of the Qualifier Committee must be identified and the date of the proposal defense set by December 15th. The Qualifier Proposal defense shall be completed before Spring Break of the second year (typically early March).

7. The committee will inform the student of the **Outcome of the Qualifier Proposal** following their meeting after the oral presentation. If the student has failed the examination, at the discretion of the committee, the student may be allowed to present a revised Qualifier Proposal before April 15. On passing the Qualification process, the student has officially reached the dissertation stage and needs to convene a dissertation committee within one month (see the rules for the dissertation stage).

8. **Grading:** Students will register for PHYS 796 Qualifier Proposal in the Spring of their second year and the Qualifier Committee will assign a grade based on the student's success in the qualifier proposal.

Preliminaries:

The student must have reached Advanced Standing, completed all required research rotations, and must have passed (obtain a grade of B- or better) in each of the core required Physics courses (Phys 503A, Phys 506A, Phys 511A, and Phys 526). They must also be in good academic standing with a cumulative *grade point average* (GPA) of B (3.0) or higher. Students who have earned a lower grade in a core course may be allowed to retake that course. However, retaking of courses is dependent on the evaluation of the student's overall performance in the program including research, teaching, and overall coursework. Passing of these core courses takes the place of a formal "Qualifier Exam", in which knowledge in core subject areas of physics is assessed with a written or oral test. A traditional "Qualifier Exam" is *not* a part of the Graduate Program in Physics at Emory.