

## Transition to New Procedures for Comprehensive Exams

### **Update for current students**

B. Doak and T. Newman, May 2007

The Department of Physics has recently decided to modernize the first year graduate curriculum, and to substantially change the comprehensive examination procedure. These changes will primarily affect students entering in fall 2007 and thereafter. This document is for our current students who have yet to pass the written comprehensive examination. It explains the old and new systems, emphasizes the university's regulations for the exams, and indicates under what conditions current students may elect to take the new examination format.

Professor Bruce Doak will be the new Graduate Program Director starting summer 2007.

### **University regulation for comprehensive exams (from graduate catalog):**

“When students have essentially completed the coursework in an approved program of study, they should request permission to take the comprehensive examinations. Some academic units may require that the foreign language requirements be fulfilled before taking the comprehensive examinations. These written and oral examinations are designed to test the student's mastery of the field of specialization. PhD comprehensive examinations are administered by a committee consisting of three to five members, depending on the requirements of the academic unit. Failure in the comprehensive examinations is considered final unless the supervisory committee and the head of the academic unit recommend, and the dean of graduate studies approves, a reexamination. A reexamination may be administered no sooner than three months and no later than one year from the date of the original examination. Only one reexamination is permitted.”

**The Department of Physics will be enforcing the University regulations on comprehensive examinations. Students will have at most two attempts at each of the written and oral exams. For those current students who have yet to pass the comprehensive exams, but who have had one or more prior attempts, we will allow one further attempt.**

**Old procedure (to be discontinued for students entering fall 2007):**

Students are required to attempt the **written comprehensive examination**, which is generally taken at the beginning of their third semester (meaning, on return from summer break at the beginning of their second year of study). The exam is administered as a formal written exam of two four-hour sessions, taken on two separate days. The first session covers material from classical physics (classical mechanics and electromagnetism), while the second session covers material from non-classical physics (quantum mechanics and statistical mechanics). Students are required to achieve a total score greater than 50% in order to pass the written comprehensive examination. The exam is also offered at the beginning of the spring semester.

Some physics sub-disciplines in the department require a second written examination on subject matter particular to that discipline, although this has become less common in recent years. The **oral comprehensive examination** is usually concatenated with the thesis prospectus. Students are encouraged to take their oral examination in either the second or third year of study. In recent years, the oral exam has had the following format: students present an overview of their thesis research topic, and the examining committee asks questions pertaining to this overview, as well as more general questions relating to the student's chosen physics sub-discipline.

The old-style written comprehensive exam will be offered twice more: in fall 2007 and spring 2008 – to allow the class of fall 2006 two attempts if required.

### **New procedure:**

The **written and oral comprehensive examinations** will be taken, in an integrated form, at the beginning of the fall semester of the second year. Students will choose one of their written reports from their two research rotations and expand it over the summer (usually while conducting summer research) into a professional-level report (ca. 20 pages) covering a particular research topic. **[Note to current students – the research rotations will come into effect in fall 2007.]** The report is due by July 31<sup>st</sup>. The report will be expected to give broad background to the research area, a synthesis of relevant literature, and a discussion of more specific topics addressed by the student during their individual work in the research rotation. The student will orally defend this report to a three person committee (which is not related to the student's eventual thesis committee). During this oral exam, the committee will gauge the student's understanding of more specialized topics in the research area in question, and probe the student's grasp of broad fundamental physics. **Students will be asked questions on fundamental physics covering the core areas of classical mechanics, electrodynamics, quantum mechanics, and statistical mechanics.**

Students who fail the written and/or oral part of the comprehensive examination will have one further chance to pass the exam at the beginning of the following spring semester. To ensure fair evaluation of students, each exam committee will have one member from the Graduate Program Committee. The student's research advisor will not serve on the exam committee.

The student will plan to present a thesis prospectus to their thesis committee by the end of the second year, or beginning of their third year.

**Conditions for current students to take the new examination procedure:**

The new examination procedure will be integrated into a new curriculum that starts in fall 2007. In particular, the new procedure requires that the student has taken two research rotations in their first year of study. Therefore, **the default for current students is to take the old-style written and oral comprehensive examinations**, as explained on p.2.

In the interests of fairness, the Department of Physics will allow **current** students to take the new-style comprehensive examination **if and only if** they have substantial research experience from working in the group of a current faculty member. If a current student has such experience and wishes to take the new-style exam, they should write a short application to the Graduate Program Director (Prof. Doak), along with a letter of support from their research advisor, describing the extent of their research experience.