Astronomy Department Oral Qualifying Examination Guide

Version 1.5 2020/05/17, *Forms Updated 2024/10/02*

Purpose: This document is intended to guide Astronomy graduate students and faculty members regarding the timing, scope, and expectations concerning the Oral Qualifying Examination (including replacing oral exposition with signed communication; both are hereafter referred to as "Orals").

Preamble: While graduate foundational courses in Space Physics and Astrophysics can help provide the solid base of knowledge necessary to pursue a PhD degree and for a successful career, classroom-based education, alone, is not a sufficient indicator of likely research success.

Why are there Orals?

As stated on the Graduate School (GRS) website, *"All students shall demonstrate mastery of their field in special examinations set by the student's department or graduate program."* The Astronomy Orals meet the GRS requirement by having each student describe a directed research project, conducted since matriculating in the PhD program, and having faculty examiners probe the student's understanding of their research and fundamental knowledge of the Space Physics and/or astrophysics necessary for independent research.

What are the Orals?

The Orals are comprised of two parts. The first is a **presentation** by the student to interested members of the Astronomy department and other departments. The second is a **closed meeting** of the student, the members of the Orals Examining Committee (hereafter just Committee), and other interested members of the faculty. The presentation is expected to offer key aspects such as motivation, methodology, investigation steps taken, analyses, and findings (if such exist) concerning a directed research project undertaken by the student under the supervision of a faculty member. The presentation should be in a format expected for scientific talks, in terms of content and style, and should be prepared to be approximately 40-45 minutes long. The closed meeting with the Committee allows the faculty to question the student on science elements of the project and related topics, to see that the student has a good grasp of the research conducted and the underpinnings, context, and importance of the work. The Committee may also question the student on topics less closely related to their research, but generally will not attempt to survey the full depth of knowledge across all of Space Physics and Astrophysics.

When are the Orals?

After receiving approval by the membership of their Committee (see link to approval form below), Orals are normally scheduled by the graduate student in consultation with their faculty advisor and the Director of Graduate Studies (DGS) to take place before the end of the student's sixth semester of graduate study. Students may not schedule Orals to take place earlier than the start of their fifth semester without a successful petition to the Astronomy faculty. If warranted, students may delay scheduling their Orals until as late as the end of the first month of their seventh semester, if such delay is approved by their faculty advisor and the DGS. Students seeking to delay taking their Orals beyond that time must demonstrate extraordinary

circumstances and must achieve a successful petition of the Astronomy faculty. Students who do not schedule their Orals by the end of their sixth semester and have not sought an extension are considered to have not made adequate academic progress and must depart the program.

What does the Faculty expect?

The faculty admits students into the PhD program who are believed to have the capability to thrive in our program and to complete a PhD degree. As such, the Astronomy faculty expects students to pass the Orals.

Who is on an Orals Examination Committee?

The graduate student, in consultation with their advisor and the DGS, selects the members of their Committee. Committee membership must be approved by the student's advisor/supervisor, the DGS, and the Department Chair prior to scheduling the Orals. Committee membership is expected to reflect the wide scientific breadth across the Astronomy Department and may not consist of only in-field experts.

Each Committee will have a single Chair, who manages the Examination, directs the flow and depth of questioning, and may declare a question or an intervention out of order. While nearly all examinations proceed in a friendly, collegial fashion, in the event of a conflict or disagreement, the Chair's choice prevails. The student chooses the Chair, subject to limits described below.

Committees will have no fewer than three and no more than five members of the faculty, primarily drawn from the Astronomy Department. Astronomy faculty members holding Research-modified titles may be members, and Chairs, of Committees, but they may not account for a majority of the Committee. Faculty members with unmodified or Research-modified titles from other departments may be appointed as additional Committee members, but such appointments do not reduce the required numbers of Astronomy-based faculty. In all cases, there must be a majority of Astronomy teaching faculty (those holding unmodified titles) on each Committee.

The student's research advisor/supervisor is normally expected to be a member of the Committee, with full voting rights, but may not serve as Committee Chair. Advisors, and indeed all Committee members, may offer occasional clarifications, but must not intervene to answer questions directed to the student by other Committee members. If the student's advisor holds an Emeritus title, that advisor may serve as non-voting Committee member, but no other Emeritus titled faculty members may be Committee members.

What are the possible outcomes of an Orals?

The expectation is that students will pass the Orals. A student found to be deficient, generally in multiple areas (underlying science, research, presentation, Q&A), will be given an outcome of fail. A Committee may, under extraordinary conditions, 'continue' or 'table' an examination to a later time for the examination to be completed. Such continued examinations must be completed within three months of the initial student presentation. All exam outcomes are immediately reported to the DGS and Chair, with pass and fail outcomes also immediately reported to GRS.

May Orals be repeated?

An outcome of fail for an Orals exam represents the Committee's best and final judgement of a student's readiness for conducting independent research leading to the PhD degree. In extraordinary circumstances, a petition to retake Orals may be presented to the Astronomy faculty, but the student must present strong mitigating circumstances for the petition to be accepted by the faculty.

Where are the necessary forms and where do they go?

1. Orals Committee Membership Form:

https://www.bu.edu/astronomy/student-resources/graduate/forms#qual

Student, in conjunction with their faculty research advisor, fills out Section A. Advisor fills out Section B and forwards the form to the DGS for additional approvals.

2. General Petition Form:

https://www.bu.edu/astronomy/student-resources/graduate/forms#petitions

Student fills out Section A and B only of the form, then it goes to their faculty advisor, then on to DGS, Chair, and finally to the full Astronomy faculty.

Tips for Preparing for Orals

The Orals have two components: a public presentation and a question-and-answer session with the Committee. The presentation component has two goals: good public speaking and a well-designed talk. Practical experience is the best way to become a good public presenter. This could be gained during Journal Clubs, at scientific meetings (i.e., give a talk instead of a poster, if that choice is available), or by rounding up a collection of graduate students or others and giving trial talks. Designing a good presentation is much like designing a good paper: keep the proper audience firmly in mind and offer them a clear, compelling story. Preparing for the Q&A session might include practice sessions with your research advisor and/or others. Doing such sessions can help reduce nerves and give you confidence in your abilities to think and solve problems on your feet. For both the presentation and the Q&A session, early and frequent discussions with one's faculty research mentor/advisor about Orals planning and preparation is the wisest advice.