



# PHYS798

## Physics and Astronomy Special Topic 1

S2 Day 2014

*Physics and Astronomy*

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## General Information

Unit convenor and teaching staff

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Credit points

4

Prerequisites

Admission to MRes

Corequisites

Co-badged status

Unit description

This unit will provide students with a bespoke learning path to fully prepare them for entry into specific advanced subject units at 700 level offered by the Department of Physics and Astronomy. The program will draw on a mixture of existing lecture content and established teaching laboratories further enriched by individually guided study to provide a program tailored to the students' individual development needs.

## Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at <https://www.mq.edu.au/study/calendar-of-dates>

## Learning Outcomes

On successful completion of this unit, you will be able to:

- Obtain a more advanced understanding of the workings of the quantum world
- Be able to use the acquired knowledge to solve advanced problems in quantum mechanics
- Understand and be able to apply quantum science to more advanced topics e.g quantum optics.

## Assessment Tasks

Name	Weighting	Due
<u>Weekly Exercises</u>	25%	14/11/14
<u>Mid-Unit Project</u>	15%	19/9/2014
<u>Final Project</u>	15%	14/11/2014
<u>Final Examination</u>	45%	29/11/14

### Weekly Exercises

Due: **14/11/14**

Weighting: **25%**

1 moderate question each week to stay current with the lecture material

On successful completion you will be able to:

- Obtain a more advanced understanding of the workings of the quantum world
- Be able to use the acquired knowledge to solve advanced problems in quantum mechanics

### Mid-Unit Project

Due: **19/9/2014**

Weighting: **15%**

One mid-unit three week PROJECT (individual work), with written (<10pages) and oral presentation (<15 mins) on an advanced topic in quantum mechanics.

On successful completion you will be able to:

- Obtain a more advanced understanding of the workings of the quantum world
- Be able to use the acquired knowledge to solve advanced problems in quantum

mechanics

## Final Project

Due: **14/11/2014**

Weighting: **15%**

One Final three week PROJECT (individual work), with written (<10pages) and oral presentation (<15 mins) on an advanced topic in quantum mechanics.

On successful completion you will be able to:

- Obtain a more advanced understanding of the workings of the quantum world
- Be able to use the acquired knowledge to solve advanced problems in quantum mechanics
- Understand and be able to apply quantum science to more advanced topics e.g quantum optics.

## Final Examination

Due: **29/11/14**

Weighting: **45%**

Final Exam - which focuses on demonstrating a clear understanding and facility in problem solving in advanced QM based on course lecture materials, projects and directed reading. This is a separate, more penetrating exam than that given PHYS304 which will probe the student's understanding of advanced quantum mechanics at the MRES level.

On successful completion you will be able to:

- Obtain a more advanced understanding of the workings of the quantum world
- Be able to use the acquired knowledge to solve advanced problems in quantum mechanics
- Understand and be able to apply quantum science to more advanced topics e.g quantum optics.

## Delivery and Resources

Lectures/Videos

Various Lecture Demonstrations

Directed Reading

## Unit Schedule

Lectures:

Mon: 16:00-18:00 W5C 312

Fri: 9-10 W5C 210

Tute:

Thur: 14:00-15:00 CB3 312

## Learning and Teaching Activities

### Lectures

Lectures

### Personal Reading

Reading textbook and associated texts/websites

### Projects

Mid-unit and final projects on a topic exploring advanced quantum mechanics

### Directed Reading and Presentation

Directed reading on topics in advanced QM

## Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central](#). Students should be aware of the following policies in particular with regard to Learning and Teaching:

Academic Honesty Policy [http://mq.edu.au/policy/docs/academic\\_honesty/policy.html](http://mq.edu.au/policy/docs/academic_honesty/policy.html)

Assessment Policy <http://mq.edu.au/policy/docs/assessment/policy.html>

Grading Policy <http://mq.edu.au/policy/docs/grading/policy.html>

Grade Appeal Policy <http://mq.edu.au/policy/docs/gradeappeal/policy.html>

Grievance Management Policy [http://mq.edu.au/policy/docs/grievance\\_management/policy.html](http://mq.edu.au/policy/docs/grievance_management/policy.html)

Disruption to Studies Policy [http://www.mq.edu.au/policy/docs/disruption\\_studies/policy.html](http://www.mq.edu.au/policy/docs/disruption_studies/policy.html) *The Disruption to Studies Policy is effective from March 3 2014 and replaces the Special Consideration Policy.*

In addition, a number of other policies can be found in the [Learning and Teaching Category](#) of Policy Central.

## Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: [https://students.mq.edu.au/support/student\\_conduct/](https://students.mq.edu.au/support/student_conduct/)

## Student Support

Macquarie University provides a range of support services for students. For details, visit <http://students.mq.edu.au/support/>

## Learning Skills

Learning Skills ([mq.edu.au/learningskills](http://mq.edu.au/learningskills)) provides academic writing resources and study strategies to improve your marks and take control of your study.

- [Workshops](#)
- [StudyWise](#)
- [Academic Integrity Module for Students](#)
- [Ask a Learning Adviser](#)

## Student Services and Support

Students with a disability are encouraged to contact the [Disability Service](#) who can provide appropriate help with any issues that arise during their studies.

## Student Enquiries

For all student enquiries, visit Student Connect at [ask.mq.edu.au](http://ask.mq.edu.au)

## IT Help

For help with University computer systems and technology, visit <http://informatics.mq.edu.au/help/>.

When using the University's IT, you must adhere to the [Acceptable Use Policy](#). The policy applies to all who connect to the MQ network including students.

## Graduate Capabilities

### PG - Discipline Knowledge and Skills

Our postgraduates will be able to demonstrate a significantly enhanced depth and breadth of knowledge, scholarly understanding, and specific subject content knowledge in their chosen fields.

This graduate capability is supported by:

### Learning outcomes

- Obtain a more advanced understanding of the workings of the quantum world
- Be able to use the acquired knowledge to solve advanced problems in quantum

mechanics

- Understand and be able to apply quantum science to more advanced topics e.g quantum optics.

## Assessment tasks

- Weekly Exercises
- Mid-Unit Project
- Final Project
- Final Examination

## Learning and teaching activities

- Lectures
- Reading textbook and associated texts/websites
- Mid-unit and final projects on a topic exploring advanced quantum mechanics
- Directed reading on topics in advanced QM

## PG - Critical, Analytical and Integrative Thinking

Our postgraduates will be capable of utilising and reflecting on prior knowledge and experience, of applying higher level critical thinking skills, and of integrating and synthesising learning and knowledge from a range of sources and environments. A characteristic of this form of thinking is the generation of new, professionally oriented knowledge through personal or group-based critique of practice and theory.

This graduate capability is supported by:

## Learning outcomes

- Obtain a more advanced understanding of the workings of the quantum world
- Be able to use the acquired knowledge to solve advanced problems in quantum mechanics
- Understand and be able to apply quantum science to more advanced topics e.g quantum optics.

## Assessment tasks

- Weekly Exercises
- Mid-Unit Project
- Final Project
- Final Examination

## Learning and teaching activities

- Lectures

- Reading textbook and associated texts/websites
- Mid-unit and final projects on a topic exploring advanced quantum mechanics
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## PG - Research and Problem Solving Capability

Our postgraduates will be capable of systematic enquiry; able to use research skills to create new knowledge that can be applied to real world issues, or contribute to a field of study or practice to enhance society. They will be capable of creative questioning, problem finding and problem solving.

This graduate capability is supported by:

### Learning outcomes

- Obtain a more advanced understanding of the workings of the quantum world
- Be able to use the acquired knowledge to solve advanced problems in quantum mechanics
- Understand and be able to apply quantum science to more advanced topics e.g quantum optics.

### Assessment tasks

- Weekly Exercises
- Mid-Unit Project
- Final Project
- Final Examination

### Learning and teaching activities

- Lectures
- Reading textbook and associated texts/websites
- Mid-unit and final projects on a topic exploring advanced quantum mechanics
- Directed reading on topics in advanced QM

## PG - Effective Communication

Our postgraduates will be able to communicate effectively and convey their views to different social, cultural, and professional audiences. They will be able to use a variety of technologically supported media to communicate with empathy using a range of written, spoken or visual formats.

This graduate capability is supported by:

### Learning outcomes

- Be able to use the acquired knowledge to solve advanced problems in quantum



mechanics

- Understand and be able to apply quantum science to more advanced topics e.g quantum optics.

## **Assessment tasks**

- Mid-Unit Project
- Final Project

## **Learning and teaching activities**

- Mid-unit and final projects on a topic exploring advanced quantum mechanics
- Directed reading on topics in advanced QM

## **PG - Capable of Professional and Personal Judgment and Initiative**

Our postgraduates will demonstrate a high standard of discernment and common sense in their professional and personal judgment. They will have the ability to make informed choices and decisions that reflect both the nature of their professional work and their personal perspectives.

This graduate capability is supported by:

## **Learning outcome**

- Understand and be able to apply quantum science to more advanced topics e.g quantum optics.

## **Assessment task**

- Final Project

## **Learning and teaching activity**

- Reading textbook and associated texts/websites
- Mid-unit and final projects on a topic exploring advanced quantum mechanics
- Directed reading on topics in advanced QM