



THE UNIVERSITY
OF QUEENSLAND
AUSTRALIA

Hans Magnus Oegren

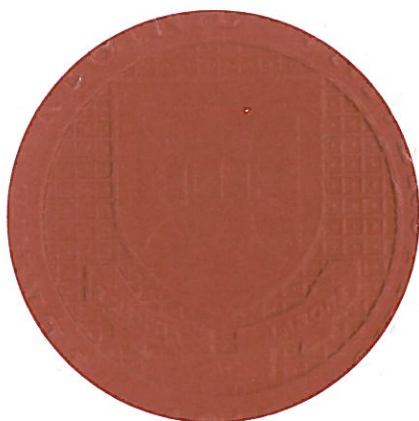
having fulfilled the conditions
prescribed by the University is, on this day,
conferred the degree of

**DOCTOR
OF
PHILOSOPHY**

IN THE FIELD OF PHYSICS

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GIVEN UNDER THE COMMON SEAL
OF THE UNIVERSITY OF QUEENSLAND
THE TWENTY-NINTH DAY OF JULY, 2011



CHANCELLOR

VICE-CHANCELLOR

ACTING ACADEMIC REGISTRAR



HANS MAGNUS OEGREN (41319198)

Page 1

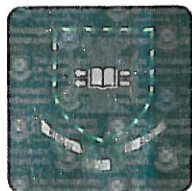
AWARDS

DOCTOR OF PHILOSOPHY IN THE FIELD OF PHYSICS

AWARD: DOCTOR OF PHILOSOPHY
DATE OF CONFERRAL: 29 JULY 2011

COURSE	#	GRADE
ENROLMENT HISTORY DETAILS		
NON-AWARD		
SEMESTER 2, 2003		
INCOMING EXCHANGE		
PHYS 6485 RESEARCH PROJECT IVH	6.00	7
	SEM GPA: 7.00	
POSTGRADUATE RESEARCH		
SEMESTER 1, 2007		
DOCTOR OF PHILOSOPHY		
19/03/2007 Accepted as FT provisional PhD candidate in school of Physical Sciences		
19/03/2007 Awarded Endeavour International Postgraduate Research Scholarship		
19/03/2007 Awarded University Of Queensland International Living Allowance Scholarship		
SEMESTER 2, 2007		
DOCTOR OF PHILOSOPHY		
SEMESTER 1, 2008		
DOCTOR OF PHILOSOPHY		
11/04/2008 PhD candidature confirmed		
20/04/2008 - 31/12/2008 Interruption to PhD candidature approved		
SEMESTER 2, 2008		
DOCTOR OF PHILOSOPHY		
RSCH 9901 INTERRUPTION TO CANDIDATURE	0.00	IPR
	SEM GPA: 0.00	
SEMESTER 1, 2009		
DOCTOR OF PHILOSOPHY		
RSCH 9901 INTERRUPTION TO CANDIDATURE	0.00	IPR
	SEM GPA: 0.00	
01/01/2009 - 01/06/2009 Interruption to PhD candidature approved		
SEMESTER 2, 2009		
DOCTOR OF PHILOSOPHY		
SEMESTER 1, 2010		
DOCTOR OF PHILOSOPHY		
SEMESTER 2, 2010		
DOCTOR OF PHILOSOPHY		
SEMESTER 1, 2011		
DOCTOR OF PHILOSOPHY		
RSCH 9900 THESIS UNDER ASSESSMENT	0.00	Thesis Submitted
28/03/2011 PhD thesis submitted for assessment		

Entries below this line are invalid



Continued on page 2



HANS MAGNUS OEGREN (41319198)

Page 2

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Maureen Bowen
Acting Academic Registrar
03 AUGUST 2011

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1. THE GRADUATE

Family Name: Oegren
Given Name(s): Hans Magnus
Student Number: 41319198

2. THE AWARD

Name of award:
Doctor of Philosophy

Detail*:

This award, taught in English, requires completion of 48 units.
A standard annual load at The University of Queensland involves completion of 16 units of study. Entry is available to students who have met the following requirement:

- Bachelor's degree with at least honours class IIA. Other qualifications may be considered for entry. Please refer to information contained on the Graduate School website.

Further information about the award can be found on The University of Queensland website at www.uq.edu.au/study

* For year of issue

3. AWARDING INSTITUTION

The University of Queensland was established by an Act of the Queensland State Parliament on 10 December, 1909 and is one of Australia's premier learning and research institutions.

The University is a member of the *Universitas 21*, and also a member of Australia's Group of Eight, a coalition of leading Australian universities, intensive in research and comprehensive in general and professional education, committed to ensuring that Australia has higher education systems that are world class.

For additional information, see The University of Queensland website at www.uq.edu.au

The Australian Higher Education Graduation Statement is provided by Australian higher education institutions to graduating students on completion of the requirements for a particular higher education award. It provides a description of the nature, level, context and status of studies that were pursued by the individual named. Its purpose is to assist in both national and international recognition of Australian qualifications and to promote international mobility and professional recognition of graduates.

CERTIFICATION

Date: 3 Aug 2011

Signature:



Maureen Bowen

Capacity:
Acting Academic Registrar

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4. GRADUATE'S ACADEMIC ACHIEVEMENTS

DOCTOR OF PHILOSOPHY				
Course	Units	Title	Grade	Semester completed
RSCH9000	8	Research Studies (Full-time)	IPR	Sem 1 2007
RSCH9000	8	Research Studies (Full-time)	IPR	Sem 2 2007
RSCH9000	8	Research Studies (Full-time)	IPR	Sem 1 2008
RSCH9000	8	Research Studies (Full-time)	IPR	Sem 2 2009
RSCH9000	8	Research Studies (Full-time)	IPR	Sem 1 2010
RSCH9000	8	Research Studies (Full-time)	IPR	Sem 2 2010
RSCH9900	0	Thesis Under Assessment	THS	Sem 1 2011
RSCH9901	0	Interruption to Candidature	IPR	Sem 2 2008
RSCH9901	0	Interruption to Candidature	IPR	Sem 1 2009

The Australian Higher Education Graduation Statement relates to study completed while enrolled in the program named above only. The official academic transcript provides a full record of courses completed at The University of Queensland.

Thesis Title

Quantum-Atom Optics and Dynamical Simulations of Fermionic Many-Body Systems

Thesis Abstract

We study the dynamics of density-density correlation functions in pair-production processes of dissociation of a Bose-Einstein condensate of diatomic molecules and atomic four-wave mixing via condensate collision. These processes provide a matter-wave analog of parametric down-conversion from quantum optics, leading a new paradigm of fermionic quantum-atom optics in the case of fermionic statistics of the constituent atoms. We examine the role of spatial inhomogeneity of harmonically trapped molecular condensates on the strength and the shape of atom-atom correlations. We also demonstrate the first successful application of a Gaussian phase-space method to a first-principle dynamical simulation of a multimode fermion-boson model.

Key to grading:

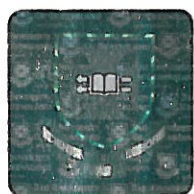
The University of Queensland uses criterion-referenced assessment as the method to explicitly define the relationships between summative assessment and the i) learning objectives, ii) standards met, iii) performance expectations held of students and iv) award of grades. Marks and grades are awarded by reference to predetermined criteria rather than by reference to the performance of other students in the course. All necessary information about assessment is listed in the course profile (see HUPP 3.20.9). Course profiles are available via www.uq.edu.au/study

A full explanation of the codes awarded by The University of Queensland can be found on the reverse of the official academic transcript.

5. DESCRIPTION OF THE AUSTRALIAN HIGHER EDUCATION SYSTEM

Introduction

The Australian higher education system consists of independent, self-governing public and private universities and higher education institutions that award higher education qualifications. All higher education providers must be listed on the Australian Qualifications Framework Register of Recognised Education Institutions and Authorised Accreditation Authorities in Australia. This register is developed under instructions from Commonwealth, State and Territory Education and Training Ministers (See: <http://www.aqf.edu.au>).



Qualifications

The Australian Qualifications Framework (AQF) is a single national and comprehensive system of qualifications offered by higher education, vocational education and training, and secondary schools. The AQF comprises a set of national qualifications (ie awards), titles and qualification descriptors (See accompanying diagram). The AQF specifies the main criteria for defining qualifications based on the general characteristics of learning outcomes at each qualification level. The main qualifications awarded by higher education institutions are bachelors, masters and doctoral degrees, and graduate certificates and graduate diplomas. Research higher degrees at masters and doctoral level are normally assessed by external examiners. The higher education qualifications descriptors are periodically reviewed against best national and international practice. Guidelines for each qualification title are published in the Australian Qualifications Framework Implementation Handbook (<http://www.aqf.edu.au>).

Admission

Requirements for admission to particular programmes are set by individual universities and colleges that generally provide a range of routes for entry and admit those students considered to have potential to successfully complete programmes of study. Admission of school leavers to undergraduate programmes typically is on the basis of the level of achievement in Year 12 secondary education, although some institutions and programmes also use interviews, portfolios or demonstrated interest or aptitude. Most institutions also provide alternative entry provisions via bridging or foundation programs for mature age students or other special provisions. Admission to postgraduate programmes is generally based on the level of achievement in previous higher education studies; in most cases, admission to PhD programmes is based on high achievement in a research masters degree or in a bachelors degree with first class honours or second class honours division A.

Quality

Australia has an international reputation for high quality education that is built on best practice in accreditation, quality recognition, quality assurance, and student consumer protection. All higher education institutions must be accredited by State and Territory Governments in accordance with strict criteria detailed in the National Protocols for Higher Education Approval Processes. These Protocols are nationally agreed principles that ensure consistent criteria and standards across Australia in such matters as the recognition of new universities, the operation of overseas higher education institutions in Australia, and the accreditation of higher education courses offered by institutions other than universities (See: <http://www.deewr.gov.au/HigherEducation/Pages/default.aspx>).

All institutions receiving Australian Government financial support must meet quality and accountability requirements that are set out in the Higher Education Support Act 2003. The Australian Government also uses a range of tools to measure and monitor the quality of outcomes, while the interests of international students are protected by the Education Service for Overseas Students Act 2000 and its National Code, providing tuition and financial assurance and a consistent approach to institution registration.

Australian Universities are autonomous bodies that are responsible for managing quality through internal accreditation processes and commitment to codes of practice. Universities and other higher education providers are required by legislation to have in place appropriate quality assurance processes. These processes are periodically audited by the Australian Universities Quality Agency (AUQA).

AUQA is Australia's principal national quality agency for higher education. It is an independent body that undertakes quality audits of higher education institutions and accreditation authorities (See: <http://www.auqa.edu.au>). AUQA publicly reports on performance and outcomes, assists in quality enhancement and advises on quality assurance.



Australian Qualifications Framework

Schools Sector Qualifications	Vocational Education and Training Sector Qualifications	Higher Education Sector Qualifications
Senior Secondary Certificate of Education (SSCE)	Vocational Graduate Diploma Vocational Graduate Certificate Advanced Diploma Diploma Certificate IV Certificate III Certificate II Certificate I	Doctoral Degree Masters Degree Graduate Diploma Graduate Certificate Bachelor Degree Associate Degree, Advanced Diploma Diploma

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