



LUNDS UNIVERSITET
Lunds Tekniska Högskola

Magnus Ögren

770406-4679

HAR AVLAGT

Teknologie doktorsexamen

UTBILDNINGEN SLUTFÖRD DEN 24 OKTOBER 2008

HAS BEEN AWARDED THE DEGREE OF

*Doctor of Philosophy in
Engineering*

EDUCATION COMPLETED ON OCTOBER 24, 2008

ANDERS AXELSSON
REKTOR, LTH/DEAN, FACULTY OF ENGINEERING, LTH

Examensbeviset utfärdat den 28 oktober 2008

Degree certificate issued on October 28, 2008



**LUNDS
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Lunds Tekniska Högskola

Teknologie doktorexamen
Examen på forskarnivå

*Degree of Doctor of Philosophy in
Engineering
A Third Cycle Degree*

Namn/*Name*

Personnummer/*Civic registration number*

Magnus Ögren

770406-4679

Magnus Ögren uppfyller kraven för Teknologie doktorexamen, 240 högskolepoäng, i Fysik vid Lunds Tekniska Högskola.

Magnus Ögren har dels blivit godkänd i de kunskapsprov som ingår i utbildningen, dels författat och vid en offentlig disputation muntligen försvarat en vetenskaplig avhandling, som av vederbörande betygsnämnd 2008-10-24 förklarats godkänd enligt bestämmelserna i högskoleförordningen (SFS 1993:100). För ytterligare information se bifogat Diploma Supplement.

Magnus Ögren, born on April 6, 1977, has fulfilled the requirements for the Doctor of Philosophy in Engineering, 240 higher education credits/ECTS, in Physics, Faculty of Engineering, LTH.

Magnus Ögren has passed all examinations prescribed and furthermore written and publicly defended a doctoral thesis, which was subsequently approved by the examining committee October 24, 2008 in accordance with the Higher Education Act (SFS 1993:100). For further information see attached Diploma Supplement.

Doktorsavhandlingens titel och omfattning

Semiklassisk analys av super-skalstruktur för Fermi gaser i atomfällor, 160 högskolepoäng

Title of the Doctoral Thesis and Validity

Semiclassical Analysis of Super-Shell Structure in Trapped Fermi Gases, 160 higher education credits/ECTS

Huvudhandledare
Supervisor

Stephanie Reimann

Opponent
Opponent

Patricio Leboeuf, Université de Paris Sud, Frankrike

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Kurser <i>Courses</i>	Högskolepoäng <i>Higher Education Credits/ECTS</i>	Examinator <i>Examiner</i>
Atomfysik FK <i>Advanced Atomic Physics</i>	7.5	Anne L'Huillier
Semiklassiska metoder för finita kvantsystem <i>Semiclassical Physics for Finite Quantal Systems</i>	6	Stephanie Reimann
Icke-linjär optik <i>Non-linear Optics</i>	7.5	Stefan Kröll
Högskolepedagogisk introduktionskurs <i>Introduction to Teaching in Higher Education</i>	3	Roy Andersson
Mångpartikelfysik <i>Many-body Physics</i>	4.5	Sven Åberg
Sommarskola, Trieste 27 aug - 7 sep 2007 <i>Summer School on Novel Quantum Phases and Non-equilibrium Phenomena in Cold Atomic Gases, Trieste, August 27-Sep 7, 2007</i>	3	Sven Åberg
Kvantdynamik <i>Quantum Dynamics</i>	3	Sven Åberg
Beräkningsverktyg för kärnstrukturteori <i>Computational Environment for Nuclear Structure</i>	3	Sven Åberg
Ledarskap och gruppdynamik <i>Leadership, Teams and Coaching</i>	3	Sven Åberg



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Kurser examinerade utanför utbildningen på forskarnivå vid Lunds Tekniska Högskola

The following courses have been studied outside the framework of the postgraduate programme at Lund University, Faculty of Engineering, LTH

Kurser <i>Courses</i>	Högskolepoäng <i>Higher Education</i> <i>Credits/ECTS</i>	Högskola <i>University</i>
Matematisk fysik, fortsättningskurs 1, kärnstrukturteori <i>Mathematical Physics, Advanced Course 1, Theory of Nuclear Structure</i>	7.5	Lunds universitet
Fysik: Fysikens numeriska metoder <i>Numerical Methods of Physics</i>	7.5	Lunds universitet
Matematik 3: Differentialgeometri <i>Differential Geometry</i>	7.5	Lunds universitet
Matematik fortsättningskurs, funktionalanalys och harmonisk analys <i>Functional Analysis and Harmonic Analysis</i>	7.5	Lunds universitet
Kvantkaos <i>Quantum Chaos</i>	7.5	Lunds universitet
Mekanik, fortsättningskurs <i>Engineering Mechanics, Advanced Course</i>	7.5	Lunds universitet
Spektralteori i Hilbert rum <i>Spectral Theory in Hilbert Spaces</i>	6	Lunds universitet



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Kommentarer/*Comments*

60 högskolepoäng motsvarar ett års heltidsstudier. Före den 1 juli 2007 användes ett poängsystem där 1 poäng motsvarade en veckas heltidsstudier. Kurser som påbörjades före den 1 juli 2007 har fått dessa poäng konverterade till högskolepoäng genom att multipliceras med 1,5.

60 higher education credits equals one year of fulltime studies. Before July 1, 2007, a credit system was used where 1 credit point was equivalent to one week of full time studies. For courses attended before July 1, 2007, the credit points have been converted to credits according to the new system by multiplying with 1.5.

Detta bevis är fastställt 11 augusti 2008 av styrelsen för Lunds Tekniska Högskola (Dnr LTH 2008/457).
This diploma was adopted by the Board of Faculty of Engineering on August 11, 2008 (Dnr LTH 2008/457).

För verifiering av detta dokument kontakta Lunds Universitet, Lunds Tekniska Högskola, Box 118, 221 00 Lund.
E-post: Forskarutbildning@kansli.lth.se, Telefon: 046/222 00 00, Fax 046/222 45 31
*To verify this document, please contact Lund University, Faculty of Engineering, P.O. Box 118,
SE-221 00 Lund, Sweden. E-mail: Forskarutbildning@kansli.lth.se, Phone: +46 46-222 00 00, Fax +46 46 222 45 31*

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På universitetets vägnar
On behalf of the Registrar

Malin Bernerson
Examenshandläggare
Degree officer



LUNDS UNIVERSITET

Lunds Tekniska Högskola

DIPLOMA SUPPLEMENT

This Diploma Supplement model was developed by the European Commission, Council of Europe and UNESCO/CEPES. The purpose of the supplement is to provide sufficient independent data to improve the international "transparency" and fair academic and professional recognition of qualifications (diplomas, degrees, certificates etc.). It is designed to provide a description of the nature, level, context, content and status of the studies that were pursued and successfully completed by the individual named on the original qualification to which this supplement is appended. It should be free from any value judgements, equivalence statements or suggestions about recognition. Information in all eight sections should be provided. Where information is not provided, an explanation should give the reason why.

1. Information identifying the holder of the qualification

1.1 Family name: Ögren

1.2 Given name: Magnus

1.3 Date of birth (day/month/year): 6 April 1977

1.4 Civic registration number: 770406-4679

2. Information identifying the qualification

2.1 Date of issue: 24 October 2008

2.2 Name of qualification and (if applicable) title conferred (in original language):
Teknologie doktorsexamen

2.3 Name of qualification and (if applicable) title conferred in official translation to
English: Degree of Doctor of Philosophy in Engineering

2.4 Main field(s) of study for the qualification: Physics

2.5 Name (in original language) and status of awarding institution:

Lunds Tekniska Högskola vid Lunds Universitet (State). For further information, see 6.1.

2.6 Name (in original language) and status of institution (if different from 2.5) administering studies: Not applicable

2.7 Language(s) of instruction: Swedish and English

3. Information on the level of the qualification

3.1 Level of qualification: Education on research level, 3rd cycle (level), 4 years.

For more information on higher education in Sweden, please see attached appendix The Swedish Higher Education System.

3.2 Official length of programme: 240 higher education credits equivalent to 240 ECTS credit points.

3.3 Access requirement(s): A person has eligibility for third cycle education at Lund University Faculty of Engineering if he or she has taken a second cycle (level) degree.

The faculty board may permit an exemption from the requirement of eligibility in the case of an individual applicant, if there are special grounds.

4. Information on the contents and results gained

4.1 Mode of study: Full-time equivalent.

4.2 Degree requirements:

Scope

A degree of Doctor is obtained after the research student has completed an educational programme of 240 higher education credits in a subject of education at the third level of higher education.

Objectives

Knowledge and understanding

For a degree of Doctor research students must

- demonstrate broad knowledge in and a systematic understanding of the field of research, together with deep and up-to-date specialist knowledge in a defined part of the field of research; and
- demonstrate familiarity with scholarly methods in general and with methods in the specific field of research in particular.

Skills and abilities

For a degree of Doctor research students must

- demonstrate an ability to engage in scholarly analysis and synthesis and in independent, critical examination and assessment of new and complex phenomena, issues and situations;
- demonstrate an ability to identify and formulate issues, critically, independently and creatively, and proceeding with scientific precision, and to plan and, using appropriate

methods, conduct research and other advanced tasks within specified time limits, and to scrutinise and evaluate such work;

- demonstrate, in a dissertation, their ability to make a substantial contribution to the development of knowledge by their own research;
- demonstrate an ability to present and discuss research and research results with authority, in dialogue with the scholarly community and society in general, orally and in writing, in both national and international contexts;
- demonstrate an ability to identify their need of further knowledge; and
- demonstrate a potential to contribute to the development of society and support other people's learning, both in the field of research and education and in other advanced professional contexts.

Judgement and approach

For a degree of Doctor research students must

- demonstrate intellectual independence and scholarly integrity and an ability to make ethical assessments relating to research; and
- demonstrate deeper insight into the potential and limitations of scholarship, its role in society and people's responsibility for how it is used.

Scholarly dissertation (doctoral dissertation)

For a degree of Doctor the research student must have received a passing grade on a scholarly dissertation (doctoral dissertation) worth at least 120 higher education credits.

Other

For a degree of Doctor with a certain area of specialisation more precise requirements are also to apply, as determined by each higher education institution itself within the framework of the requirements in this qualification description.

4.3 Programme details (e.g. modules or units studied), and the individual grades/marks/credits obtained: See degree certificate.

4.4 Grading scheme and, if available, grade distribution guidance: The student has passed all courses in the certificate in a formal examination. Lund university only uses a Pass/Fail grading system for third cycle education.

4.5 Overall classification of the qualification (in original language): Not applicable for Swedish degrees.

5. Information on the function of the qualification

5.1 Access to further study: Not applicable

5.2 Professional status (if applicable): Not applicable

6. Additional information

6.1 Additional information:

Third cycle educations are on research level. There are often two degrees on a research level awarded at a faculty of engineering in Sweden; Teknologie doktor (Doctor of Philosophy in Engineering) after 4 years of studies (240 higher education credits) and Teknologie licentiat (Licentiate in Engineering) after 2 years of studies (120 higher education credits). Optionally, a Teknologie doktor degree can be obtained following studies on top of a Teknologie licentiat degree. The requirement for a Teknologie doktor degree is identical, regardless of the path of studies.

6.2 Further information sources:

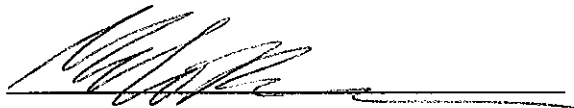
Lund University, Faculty of Engineering
Box 118
SE-221 00 Lund
Sweden
+46 46 222 00 00
<http://www.lth.se>

Swedish National Agency of Higher Education
the Swedish ENIC/NARIC office
Box 7851
SE-103 99 Stockholm, Sweden

7. Certification of the supplement

7.1 Date: 28 October 2008

7.2 Signature and official stamp or seal (if used)



Malin Bernerson

7.3 Capacity: Degree Officer



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8. Information on the national higher education system

See attached appendix: *The Swedish Higher Education System.*

The Swedish Higher Education System

(The following description is approved by the Swedish National Agency for Higher Education)

General

Higher education institutions have great autonomy in the organisation of studies, use of resources and general administration. The Government may award the status of *universitet* to higher education institutions that meet certain criteria. Independent higher education providers may be recognised by the Government, obtain the right to award degrees and receive state subsidies. Diplomas from all higher education institutions that are recognised by the Government have equal official value. The same law governs all state higher education institutions. All Swedish degrees are issued in accordance with the same degree ordinance.

Quality assurance

The Swedish National Agency for Higher Education is responsible for quality evaluation.

All programmes and major subjects have been evaluated during the six-year period 2001–2007. The Swedish National Agency for Higher Education has also completed two rounds of quality audits of higher education institutions. Evaluation reports are public.

Access and admission to higher education

Higher education at all levels has two strata of eligibility: general/basic and (additional) specific requirements.

General eligibility to the first level is the same for all higher education. General eligibility is attained either by a) completing an upper-secondary school programme and obtaining a Pass grade or better in courses comprising at least 90 percent of the credits required for the programme, or b) having the potential to benefit from the education, by virtue of other education, practical experience or other circumstances. People who are at least 25 years old, who have been employed for four years

and have a command of English and Swedish corresponding to that obtained by completing a national upper-secondary programme are also considered to have general eligibility. The specific requirements vary according to the field of higher education and are expressed in terms of upper-secondary school qualifications in specific subjects. Restricted admission is used for all study programmes and courses.

Entitlement to award degrees

The Swedish National Agency for Higher Education decides which state institutions may grant permission to award degrees at the first and second level. All state higher education institutions may award general degrees at the first level and *magisterexamen*. General permission to grant *masterexamen* and degrees at the third level may be given to higher education institutions in the fields in which they are permitted to offer the third level degrees. Other institutions may be permitted to award *masterexamen* after appraisal and official recognition of their academic standards.

There are no general rules for permission to grant professional degrees. The Swedish National Agency for Higher Education is responsible for giving permission to award professional degrees after reviewing applications to do so.

Degrees

Higher education in Sweden is divided into three levels; the first, second and third. All degrees are awarded at one of these levels. Higher education at the first and second levels is provided in the form of courses. Courses may be grouped together into programmes with varying levels of individual choice. Students themselves are also able to combine different courses towards a degree. A course syllabus is required for each course at the first and second level and a curriculum for each degree programme.

Educational level and intended learning outcomes have to be specified for each course. Sweden has a system of higher education credits (*högskolepoäng*); a normal 40-week academic year corresponds to 60 higher education credits. The system is compatible with ECTS credits.

In the Degree Ordinance, the Government has laid down which degrees may be awarded and the objectives as well as intended learning outcomes for these degrees. In the Swedish higher education system there are generally no intermediate qualifications. All degrees are regarded as final qualifications, even if there is a possibility to continue studying. Degrees are divided into general degrees and professional degrees. Translations into English of all degree names are regulated at the national level. An institution of higher education may decide that a discipline precedes a degree name e.g. filosofie kandidatexamen or medicine doktorexamen or/and add a major subject/field of studies e.g. civilingenjörsexamen i maskinteknik.

General degrees

First level:

1. **Högskoleexamen** (University Diploma) requires 120 higher education credits and a diploma project. The corresponding degree in artistic disciplines is *konstnärlig högskoleexamen* (University Diploma in).
2. **Kandidatexamen** (Degree of Bachelor) requires 180 higher education credits with a defined main field of studies determined by each higher education institution itself. At least 90 higher education credits with increasingly in-depth studies including a diploma project of 15 higher education credits have to be completed in the main field of study. The corresponding degree in artistic disciplines is *konstnärlig kandidatexamen* (Degree of Bachelor of Arts in). ▶

Second level:

1. **Magisterexamen** (Master's Degree – One Year) requires 60 higher education credits with a defined main field of studies. At least 30 credits have to be completed in the main field of study including a thesis of 15 credits. In addition, normally the student must hold either a *kandidatexamen* or a professional degree of at least 180 higher education credits or an equivalent foreign degree. *Konstnärlig magisterexamen* (Degree of Master of Arts – One Year) is awarded in artistic disciplines.
2. **Masterexamen** (Degree of Master (Two Years)) requires 120 higher education credits with a defined main field of studies. At least 60 credits have to be completed in the main field of study including a thesis of 30 credits. In addition, in general, the student must hold either a *kandidatexamen* or a professional degree of at least 180 higher education credits or an equivalent foreign degree. *Konstnärlig masterexamen* (Degree of Master of Arts (Two Years)) is awarded in artistic disciplines. The most advanced courses for *Masterexamen* may be accepted as partial fulfilment of the requirements for a doctoral programme.

General admission requirements to general degrees or degrees in arts at the second level are: degree at the first level of at least 180 higher education credits or a corresponding foreign degree. In addition, admission may be granted to an applicant who has the potential to benefit from the education, by virtue of other educational achievements, practical experience or other circumstances.

Professional degrees:

Professional degrees are awarded in the fields of engineering, health care, agriculture, law, education, etc. Professional degrees may be awarded at either the first or the second level. With a few exceptions, general entry requirements to professional degrees are the same as to the first level. There are about 40 professional degrees. Programmes leading to professional degrees vary in length depending on their character.

Third level:

The Faculty Board decides which subjects may be offered at the third level. For every subject, a general study plan should be drawn up and approved by the Faculty Board. The study plan must state the principal organisation of the studies, the specific admission requirements, the examinations required towards the degree and whether the study programme may end with the award of a *licentiatexamen*.

Two degrees are offered in the third level:

1. **Licentiatexamen** (Degree of Licentiate) requires at least 120 higher education credits including a thesis of at least 60 credits. The Faculty Board may also decide that a *licentiatexamen* can be awarded as an intermediate degree towards *doktorsexamen*.
2. **Doktorsexamen** (Degree of Doctor) requires 240 higher education credits including a thesis of at least 120 credits. The thesis has to be defended publicly.

Admission requirements to the third level are:

The applicant has to be deemed to have ability to benefit from the education.

And general requirements to the third level are:

1. a second level degree or

2. completed course requirements of at least 240 higher education credits of which 60 credits at the second level or
3. equivalent level of knowledge acquired in Sweden or abroad.

Transitional provisions:

A person who met general requirements for admission before 1 July 2007 should be considered as eligible for admission until 30 June 2015.

The general requirements before 1 July 2007 were:

1. completed undergraduate programme of at least 120 credits (equivalent to 180 higher education credits) or
2. largely equivalent knowledge acquired in some other system in this country or abroad.

Grading

The Higher Education Ordinance states that the following grades may be awarded: Pass with Distinction (*väl godkänd*), Pass (*godkänd*) or Fail (*underkänd*) unless the institution decides to grade on some other scale. A number of courses use only two grades: Pass or Fail. Others, for example in Law and Engineering, traditionally use scales with several levels – expressed as letters or numbers. No overall grade is given for a degree and students are not ranked.

