Translation of Curriculum Statement for Graduate Level (Third-level) Education

Physics with specialization in Space and Plasma Physics

Swedish title: Fysik med inriktning mot rymd- och plasmafysik

TNFYSI08

Swedish Curriculum adopted by the Board of the Faculty of Science and Technology (Board for Third-level Education) on 2012-01-23. Translation approved 2012-01-23.

The Curriculum Statement for Third-level Education consists of three parts: a general part, this subject specialized curriculum statement, and each doctoral student's individual study plan.

Objective
Starting from basic education in the subject, the Third-level Education shall give further insights into the important parts of the subject and more thorough knowledge of at least one sub-subject. By supervision and thesis work the doctoral student shall become well prepared for a critical and independent research activity or for other professional work, where strong demands on thorough subject knowledge and research competence are formulated.

The doctoral student shall also be able to present her/his own goals and results orally and in writing to different target groups in English and, in the case of Swedish-speaking doctoral students, in Swedish.

Subject description
In the subject Physics with specialization in Space and Plasma Physics the physical processes in plasma are studied. Plasma Physics is the science concerned with the collective interaction of charged particles with electromagnetic fields.

Plasma commonly occurs in many parts of the universe and the study of plasma is important in many branches of physics. Plasma can also be created in laboratories and fusion reactors. Fusion research covers the study of the equilibrium, stability and transport in fusion plasma in
both magnetohydrodynamic and kinetic formalism.

Space Physics covers the study of the fundamental processes and dynamic interaction between different plasma areas surrounding Earth and other planets, e.g. solar wind, magnetospheres and ionospheres. The research comprises observations and experiments, carried out in international cooperation, in order to study the waves, fields and electrical current systems in plasma. This is achieved by using measuring instruments on satellites and space probes as well as earth-based methods such as radar and radio techniques. The development of new measurement and sensor technology is also included.

Within Space and Plasma Physics, theoretical research is carried out in connection with international research programmes. Space and Plasma Physics is closely related to the fields of astrophysics, electrodynamics, hydrodynamics and other parts of physics and basic natural sciences. Modern non-linear theory is naturally included in the subject area. Practical application of the research can be found in both technique and industry. The education can be directed towards the experimental and/or theoretical fields.

Information about which research areas are currently of interest within the department can be acquired by, for example, following the seminars and lecture series, or consulting the website: http://www.fysast.uu.se

Eligibility

Basic Eligibility
The basic eligibility for third level education is described in the general part of the curriculum statement.

Special Eligibility
Special eligibility for studies at research level within Space and Plasma Physics is assigned to those who have passed recognised examinations in courses of physics or in other courses in relevant subject areas to a level of at least 90 higher education credits, or have attained an equivalent level of qualification in a foreign country.
Admission

Applicants for third level program in Physics with specialization in Space and Plasma Physics must submit an application to the head of the Department of Physics and Astronomy. Admissions to places in the third level programs may take place several times every year.

In connection with the admission it must be stated how it is planned to finance both the personal maintenance of the doctoral student, and her/his research.

Program structure

In connection with the admission, each doctoral student and her/his supervisor shall draw up an individual study plan after consultation with the professor in charge of the third level program. The plan is to be approved by the head of the department (by delegation of the Faculty Board), in connection with the admission.

The individual study plan shall be reviewed jointly by the doctoral student and her/his supervisor, annually, and be provided with a summary of the achieved results and the plans for the coming year. Significant changes and any disagreement on the individual study plan shall be reported to the head of the department or, if deemed necessary, to the Board for Third-level Education.

Courses

Within the third level program there may be different kinds of courses, such as lectures, literature studies, practical training, field studies, etc. The courses are chosen in accordance with the background and research of the doctoral student. The courses are intended to provide deeper and wider insights into the subject as a foundation for, and complement to, the specialist competence acquired in the research work. In addition to specific knowledge about space and plasma physics, courses on scientific methods and written and oral presentations are of importance. The courses may be selected among courses at Uppsala university, mainly at advanced level, among joint courses for doctoral students at Uppsala university, among relevant courses at other universities, or can be literature studies.
The Third-level education must include the courses that the Board of the Faculty of Science and Technology has decided should be included, and it is recommended to include the courses this Board recommends. This holds both for courses related to the doctoral student’s research and for courses needed for doctoral students teaching at elementary or advanced level.

Courses of a lower level can be accepted as part of the Third-level education according to the rules set by the Board of the Faculty of Science and Technology.

Requirements for doctoral degree
The requirements for doctoral degree consist of on one hand passed examinations in the courses included in the approved individual study plan of each doctoral student, and on other hand passed public defense of the doctoral thesis. The program leading to the doctoral degree amounts to 240 higher education credits (four years of full-time studies), of which the thesis part amounts to a minimum of 120 higher education credits and the course part to a minimum of 60 higher education credits.

Requirements for licentiate degree
A stage of at least 120 higher education credits (two years of full-time studies) in the third level program may be completed with a licentiate degree. The requirements for this are that the doctoral student both has passed the examinations included in the program stage and has got an academic paper amounting to a minimum of 60 higher education credits passed. The course part amounts to a minimum of 40 higher education credits.

Other
Research in Physics with specialization in Space and Plasma Physics is pursued in extensive international collaborations and presumes a widespread global information exchange. It is therefore necessary that the doctoral student can make efficient use of scientific texts in English.