



Star forming region S106 (Subaru Telescope)

1 GENERAL INFORMATION

The Heidelberg Graduate School of Fundamental Physics (HGSFP) was established in recognition of the scientific excellence of the fundamental physics done at Heidelberg University by the Excellence Initiative of the German Federal and State Governments.

The School regularly invites applications from local and international students to the doctoral programme.

2 BACKGROUND INFORMATION AND GOALS

A substantial grant awarded by the Excellence Initiative allows the Department of Physics and Astronomy to introduce and develop modern concepts of doctoral training in physics and astronomy in order to increase its status of excellence both within Germany and abroad.

Today many exciting developments are occurring across various fields of fundamental physics. In this atmosphere, it is a definitive goal of the most interested doctoral students to extend their knowledge beyond their immediate area of research to neighbouring branches of physics where seemingly disparate fields grow together and depend on each other. Active learning, crossdisciplinary discussions involving students and staff alike, international exchange and mentoring are the key concepts of modern graduate training. A modular training programme and flexible entrance requirements serve to allow easier acceptance of foreign students from different countries, who come to Germany with different degrees according to their countries of origin. Note that the doctoral programme in Heidelberg follows on the Bachelor/Master system.



View from the HGSFP central office

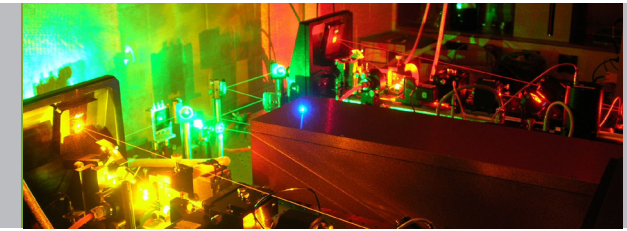
3 FIELDS OF RESEARCH OF THE GRADUATE SCHOOL

Several exciting and rapidly developing fields of physics and astronomy are well represented at Heidelberg University and the local research institutions. They form the core of research of the members of the Graduate School.

These fields are:

- the physics of elementary particles and their fundamental interactions, as it experiences a dramatic evolution with the Large Hadron Collider at CERN being operational
- the physics of complex quantum systems, for which Bose-Einstein condensates, the physics of disordered systems or atomic and molecular quantum dynamics are prominent examples
- astronomy and astrophysics, which is faced with the mysterious discoveries of dark matter and dark energy, and which depends on links to all areas of physics, from quantum dynamics to relativity
- complex classical systems, encompassing fundamental research into complex biophysical systems such as the human brain
- environmental physics, for example facing the problems of anthropogenic climate change
- mathematical physics, including renormalization group and string theory.

The branch of the Graduate School dealing with astronomy and astrophysics is identical with the International Max Planck Research School of Astronomy and Cosmic Physics at University of Heidelberg. Students accepted into the Graduate School are automatically members of the IMPRS-HD and conversely. Members of the IMPRS-QD in physics and IMPRS-PTFS are also members of the HGSFP.



Colour play in the NaLi laboratory

4 SPECIFIC BENEFITS FOR GRADUATE STUDENTS

The Heidelberg Graduate School of Fundamental Physics has introduced a modified concept of educating graduate students in the fields of physics and astronomy mentioned above. This benefits all students and serves to meet the goals set by the School. The most important features for our doctoral students are briefly detailed in this flyer.

4.1 COMPREHENSIVE THESIS ADVICE AND MENTORING

The concept of a single thesis advisor per student has been extended to a three person mentoring system forming a doctoral thesis committee. In addition to the traditional position of simply acting as thesis advisors, the mentors provide support for the students to improve their competencies and research profile. Dedicated courses, seminars and other modules form part of the structured teaching programme, designed to meet the personal interests and needs of each student. Emphasis is specifically placed on modules requiring active participation.

4.2 IMPROVED TEACHING

In order to be able to provide more courses within the newly structured doctoral programme, it is necessary to increase the teaching and research staff. The HGSFP has obtained funds to do just this and is able in this way to cover the new and extended teaching programme with six new lecturers at the group leader level.