International Leibniz Graduate School for Gravity Waves and Turbulence in the Atmosphere and Ocean (ILWAO): Phase 2

Structural concept for the graduate school

1 Concept for mentoring and interdisciplinary aspects

The graduate school ILWAO is suitable to generate significant motivation for students to participate since it deals with highly relevant and comprehensive scientific topics in an stimulating and modern research environment. The scientific subjects in ILWAO include up-to-date topics such as climate change in the atmosphere and ocean and technical applications of cross-discipline methods in experimental and theoretical physics. ILWAO is focused on specific scientific questions within a broad research field. This allows to make detailed planning and schedules for the PhD theses. At the Rostock University the master program 'Atmospheric Physics and Oceanography' is one of four main directions in physics education (see below). This promises to attract students for ILWAO related topics.

The five responsible scientists in ILWAO are all professors at the University Rostock and have great experience in supervising master and PhD students. A structured concept exists for lectures in atmospheric physics, oceanography, and fluid dynamics. This includes theoretical and experimental concepts, technical applications, and also to expand the view to neighboring subjects in physics and engineering. The PhD students are part of active research groups at the three institutes involved, which provides them with ideal conditions for rapid orientation and efficient work.

It is planned to organize committees which accompany each student during her/his PhD thesis. This will guarantee sufficient feed back between the student and the supervisors and close monitoring of the progress being made. After two years an internal evaluation is foreseen to adjust the scientific goals and the organizational structure of ILWAO, if necessary.

Interdisciplinarity of the program is guaranteed since three institutes with rather different scientific disciplines are involved. IAP concentrates on middle atmosphere physics, IOW mainly works on maritime systems like the Baltic sea, and LSM studies fluid mechanics for technical applications in the laboratory. These institutes belong to two different faculties which further expands interdisciplinary aspects. IAP and IOW have strong links to the Physics Department so that students in ILWAO get exposed to a wide range of topics in modern physics.

Students in ILWAO will present results of their work in seminars and workshops. Our experience in the first phase of ILWAO has shown that this is a very fruitful, encouraging, and motivating method for students to expose their studies to others. At an advanced level, students shall also present their scientific outcome on national and international conferences. Although not part of the official qualification for a PhD, we urge the students to publish at least one manuscript in an international peer reviewed journal. This promotes the quality of their work, advances their publication skills, and makes ILWAO visible to a broader community.

2 Environment for ILWAO

2.1 Scientific and structural environment

ILWAO is embedded in three excellent research institutes which have demonstrated to be on the forefront of their scientific disciplines. WGL institutes are regularly evaluated by an independent committee. The WGL institutes in ILWAO received very good to excellent grades during a recent evaluation which guarantees stable funding for several years to come. This allows mid term planning for experiments, field campaigns, advancement of computer hard- and software etc. A modern and sophisticated infrastructure is available at the institutes. This includes large

experimental systems (for example, several lidars and radars, research vessels, large flow channel etc.), computer facilities with large computing power, and the entire infrastructure required for such a program. The three institutes involved in ILWAO have well documented scientific programs where ILWAO fits perfectly. This facilitates mid term planning and guarantees continuity. IAP and IOW have close connections to the University Rostock, most important to the Physics Department and to LSM. Several common projects exist apart from ILWAO. IOW and LSM cooperate additionally within the Department 'Maritime Systems' of the Interdisciplinary Faculty of the University of Rostock Two institutes are located in Rostock (IOW and LSM) and one is in close vicinity (IAP in Kühlungsborn).

As has been demonstrated during the first phase of ILWAO this facilitates the organization of common seminars and allows students to participate in the regular University program. The cooperation between the Leibniz Institutes and the University Rostock is further promoted by a 'Leibniz Campus' which was founded in December 2009.

Figure 1: ILWAO workshop in October 2010 at the IAP branch in Juliusruh (Rügen).

2.2 Educational environment

As during the first phase, common seminars and workshops are scheduled within ILWAO. We plan to repeat a workshop which was held at the IAP branch in Juliusruh on the island of Rügen. Again, specialists from various disciplines will be invited to stimulate the discussion and to broaden our perspective. Within the physics master program at the Rostock University 'Atmospheric physics and oceanography' is one of four major topics (see Figure 2) which demonstrates the close connection of IAP/IOW with the University. Colloquia are held at the three institutes and also in the physics department which further broaden the perspectives of ILWAO students. The graduate school is embedded in an organizational structure with more master and PhD students, and scientists.

Figure 2: The four main topics of the Physics master program at the University Rostock (copied from the internet presentation of the Physics department). Atmospheric physics and oceanography (blue) is one of the four programs.