

The Doppler Institute for Mathematical Physics and Applied Mathematics

The Doppler Institute (DI) was established in 1993. Its main goal is the support of research with the highest standards in the areas of mathematical physics and applied mathematics, and at the same time, its mission includes a high-level doctoral study in both of these areas. Thus, DI possesses long tradition and broad experience in research and post-gradual education. For those reasons, DI submitted an application for a grant at The Czech Ministry Education to support its activities. The application was accepted and the Doppler Institute has received financial support for research and development project under No. LC06002 contract which was valid within the period 1. 3. 2006 – 31. 12. 2010.

In this report I shall present my evaluation of the DI activities during years 2006 – 2008. The report is based on the Project LC06002 Contract, and Doppler Institute Annual Reports for 2006, 2007 and 2008 (and some additional information found on DI Web page).

The permanent staff of 17 members at the Doppler Institute is from three participating institutions: Czech Technical University (CTU), Nuclear Physics Institute (NPI) and University of Hradec Kralové. Further, at DI there are temporary positions (mainly post-docs), PhD students supervised by the members of DI and visitors from abroad for collaboration purposes. The scientific activities of the project are based on 7 research programs (each program has a supervisor from DI):

- Quantum graphs and wave layers (P. Exner),
- Symmetries and integrable systems (Č. Burdík),
- Quantum information and communication, quantum optics (I. Jex),
- Aperiodic systems (E. Pelantová),
- Parametric properties of quantum systems (P. Šťovíček),
- Analytic and algebraic methods in quantum theory (M. Znojil),
- Applications of quantum chaos methods (P. Šeba).

The DI activities during 2006 – 2008 can be very briefly summarized as follows:

- Organized 16 bigger scale events (conferences, schools and workshops) which was well within the plan proposed for 2006 – 2008

- Published about 120 research publications mostly in prominent scientific journals, further 12 have been accepted for publication, and finally, another 33 papers have been submitted for publication.
- About 200 lectures have been presented within the frame of 4 regular seminars (Doppler Institute Seminar, Quantum Circle Seminar, Combinatorial and Algebraic Structures, PT symmetries/Quantum Theory and related topics and methods).
- Published one textbook and two proceedings from international conferences (co) organized by DI.
- One patent: No CZ 299759. 2008-10-03 in the area of optics.
- In 2006, 2007 and 2008 the DI members supervised 24, 24 and 21 PhD students, 12 of them have successfully defended their theses.
- The DI had supported Václav Votruba prize for the best PhD thesis in theoretical physics.

The International Association of Mathematical Physics has chosen Prague as the site of its next congress (ICMP) in the summer 2009 and the DI has become one of the main organizers. This event will require all resources for 2009, and consequently, the workshop on data analysis, planned for 2009, was organized in 2008.

Finally, I shall briefly address the main criteria following from the Project contract:

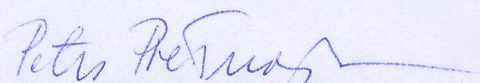
- a) Current state of the project, goals and results achieved so far.** The activities of the project are rather broad and are in line with the plan (with one exception mentioned above: the workshop on data analysis, planned for 2009, was organized in 2008). All goals and results, planned for 2006 – 2008, have been achieved.
- b) Effectiveness in achieving the project goals.** Different activities of the project have taken place in a systematic and effective manner. They include organizing various conferences and workshops, schools for doctoral students, four regular seminars, with invited speakers, and supervising quite rather large group of PhD students.
- c) Project research quality and personnel.** Both those aspects are very well taken care of: The 17 permanent members of the DI are excellent experts in the fields of mathematical physics and applied mathematics (approximately 2/3 are experienced researchers teachers, and the rest are very talented

younger researchers). There are temporary positions dominantly occupied by collaborating experts and post-docs.

- d) Changes that caused modifications of the project.** The International Association of Mathematical Physics has chosen Prague as the site of its next congress (ICMP) in the summer 2009. This choice is an honor for the Czech science, in particular, for the community of mathematical physicists. The organization of ICMP will require all resources for 2009, and consequently, the workshop on data analysis, planned for 2009, was organized in 2008. These changes are appropriate and well advised.
- e) Applicability of the project results.** All scientific activities at DI are organized by teachers, lecturers and researchers from universities or research institutes, and by post-docs and PhD students. Certainly, such activities will have a very positive influence on teaching process and research at the collaborating institutions. The DI received a patent from the area of optics, which eventually, could have technical/industrial applicability in the future.
- f) The use of financial resources of the project.** I am not able to provide a detailed evaluation. However, comparing the real activities of the project with the plan contained in the Contract, I am convinced that the financial resources, in general, were used effectively in line with the standard financial rules.
- g) Expectations for goals achievement from the point of view of overall success, project time schedule and research quality.** There are very good reasons to expect that all scientific goals of the project will be carried out successfully and on time - in reality, the number and scale of planned events have been both even extended. One can expect that the interesting and important research results which will be published in frontier journals with a proper response in the community.

Summary: Based on the observations mentioned above, I conclude that the activities of the Doppler Institute for Mathematical Physics and Applied Mathematics performed in years 2006 – 2008 have been carried out in an excellent way and well in agreement with the Project LC06002 Contract.

Bratislava, 27.1.2009


Professor Peter Prešnajder

Faculty of Mathematics, Physics and informatics

Comenius University of Bratislava