

Doppler Institute

for Mathematical Physics and Applied Mathematics

2010 Activity Report

This is a short overview of the DI activities; a list of publications is given in the attachment. The full account covering all aspects of the work done can be found at the DI web page, <http://doppler.ujf.cas.cz/index.html>

People

1. *Permanent staff* consisted of 18 members the salaries of whom were paid by the three participating institutions, CTU (Exner-part, Burdík, Havlíček, Jex, Masáková, Pelantová, Šťovíček, Tolar, Chadzitaskos, Pošta, Svoboda), NPI (Exner-part, Znojil, Dittrich, Krejčířík, Tater) and UHK (Šeba, Kříž, Martiník).
2. *Temporary positions* covered by the DI grant LC06002 were given to postdocs, in exceptional cases to PhD students, specifically the *long-term ones* (six months or more, in some cases extending to the next year) to Brougham, Gábris, Hernández-Coronado, Jakubský (all continued from the last year), Ambrož, Balková, Boland, Hamilton, Štefaňák, and Tušek, and a *short-term one* to Giancesello. In addition to that, DI visiting professorships for periods up to two months were given to Gernot Alber and Helmut Rauch, and Takuya Mine completed a one-year stay as a visiting professor (with the support of Kyoto Institute of Technology).

3. *Students*: the DI members supervised PhD theses preparation of 20 students, of which 16 were based at the CTU, 2 in the NPI and 2 at the UHK; a part of the theses were prepared in collaboration with institutes abroad. In addition, some number of undergraduate students was supervised.
4. *Degrees obtained*: Four *PhD theses* were defended: *Petr Novotný*: Graded contractions of Lie algebra $sl(3, \mathbb{C})$ (supervised by Tolar, January), *Petr Vytřas*: Quantum systems with magnetic field and point interactions (Šťovíček, May), *Martin Štefaňák*: Interference phenomena in quantum information (Jex, June), and *Karel Klouda*: Non-standard numeration systems and combinatorics on words (Pelantová and Frougny, November).
5. *Visitors*: About 35 people visited DI from abroad for collaboration purposes, typically with a talk given at one of the DI seminars.

Publications

1. *Edited volume*: proceedings of the last year International Congress of Mathematical Physics, ed. by P. Exner, *xvii+690 pp.*, were published by *World Scientific*
2. *Research papers*: there were 46 journal papers published, of which 39 of this year while 7 were accepted earlier and published in 2010 (or at the very end of 2009). In addition there were 19 papers accepted; a full list is attached. Of the 46 journal publications eleven were in *J. Phys. A: Math. Theor.*, nine in *Acta Polytechnica*, two in *Ann. Phys.*, *J. Math. Phys.*, *J. Math. Pur. Appl.*, *Phys. Lett. A*, and *Phys. Rev. A*, plus single papers in *Asympt. Anal.*, *Disc. Cont. Syn. Syst.*, *J. Approx. Theory*, *J. Funct. Anal.*, *J. Geom. Phys.*, *J. Mod. Phys.*, *J. Stat. Mech. Lett. Math. Phys.*, *Physica A*, *Physica Scripta*, *Phys. Rev. Lett.*, *Phys. Lett. B*, *RAIRO*, and three other journals.
3. *Submitted papers and proceedings contributions*: 16 items, see the attached list

Meetings

1. 19th Student Winter School on *Mathematical Physics*, Horní Polubný, January 24–30, 2010; about 45 participants from DI, Masaryk University Brno and University of Białystok; five lectures of DI members and a number of student presentations were heard.

2. Microconference *Analytic and algebraic methods in physics VI*, Prague, May 9–11, 2010; about 45 participants from thirteen countries and 35 talks
3. Spring school and workshop *Combinatorics on words*, Hojsova Stráž, May 17–21, 2010; about 20 participants
4. Workshop *Orbit functions*, Děčín, June 21–24, 2010; about 30 participants from ten countries, 15 talks
5. DI participated in organization of the *follow-up meeting* of the INI Programme “Analysis on Graphs and Applications”, Cambridge, July 26–30, 2010; cca 70 participants from 17 countries, 38 talks
6. Exploratory ESF workshop *Mathematical aspects of the physics with non-self-adjoint operators*, Praha, August 30 – September 3, 2010; about 30 participants from nine countries, 19 talks
7. Conference *QMath11 – Mathematical Results in Quantum Physics*, Hradec Králové, September 6–10, 2010; about 140 participants from 24 countries, 90 talks. A session was devoted to the 60th birthday of Ari Laptev, DI Council Chair.

Seminars

Four regular seminars worked:

1. *Doppler Institute Seminar*, 9 sessions in 2010, of which two were opening lectures of courses given by Profs. Alber and Rauch
2. *Quantum Circle Seminar*, 20 sessions apart from the workshops
3. *Combinatorial and Algebraic Structures Seminar*, 24 sessions apart from the workshops
4. A *microseminar* on quantum theory and related topics and methods, 8 sessions

DI Council Activity

1. *Discussions of Council members* occurred on *ad hoc* basis, either during meetings at conferences and other occasions, or through electronic correspondence. Five Council members were present at QMath11 and used this opportunity to exchange opinions.
2. *The present report* was discussed and approved electronically

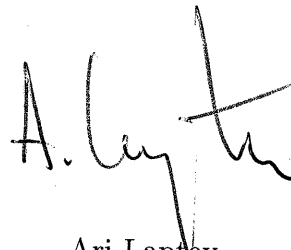
Other facts to mention

1. DI lost its friend and longtime supporter: on January 12 Pierre Duclos passed away in Prague while preparing for a talk at the Quantum Circle seminar
2. *Václav Votruba Prize*: Doppler Institute supports this award for the best PhD thesis in theoretical physics, sponsored by the *Foundation for Support of Theoretical Physics*. This year prize went to *Petr Marek* for the work entitled “Non-classicality of quantum states: decoherence and purification”; honorable mention was given to Václav Klika.
3. DI Scientific Director was elected member of *Academia Europaea*.

Signed in Prague and London on December 22, 2010



Pavel Exner
DI Scientific Director



Ari Laptev
DI Council Chairman