

Doppler Institute

for Mathematical Physics and Applied Mathematics

2009 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 payed 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, Carlone, Dridi, Gábris, Hejčík, Mestre (all continued from the last year), Burgstaller and Hernández-Coronado, and *short-term ones* to Hamilton, Lavička and Štefaňák. In addition to that, DI visiting professorships for periods up to two months were given to Stephen Barnett and Saverio Pascazio, and Takuya Mine came for a year 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 14 were based at the CTU, 4 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*: Three *PhD theses* were defended: *Hynek Bíla*: Pseudo-Hermitian Hamiltonians in quantum physics (supervised by Znojil, May), *Matěj Tušek*: Non-Euclidean geometries in quantum mechanics, quantum planar models (Šťovíček, December), and *Ondřej Turek*: Schrödinger operators on metric graphs (Exner, December).
5. *Visitors*: About 25 people visited DI from abroad for collaboration purposes, typically with a talk given at one of the DI seminars. In addition to that, about 40 speakers of the ICMP mentioned below were guests of the Doppler Institute.

Publications

1. *Research papers*: there were 48 journal papers published, of which 40 of this year while 8 were accepted earlier and published in 2009 (or at the very end of 2008). In addition there were six papers accepted; a full list is attached. Of the 48 journal publications nine were in *J. Phys. A: Math. Theor.*, four in *Phys. Rev. A* and *PRAMANA – J. Phys.*, three in *Phys. Rev. D* and *SIGMA*, two in *Phys. Lett. A*, *Physics Scr.*, *RAIRO*, and *Theor. Comp. Sci.*, plus single papers in *J. Math. Phys.*, *J. Stat. Mech.*, *Physica A*, *Phys. Rev. E*, and 11 other journals.
2. *Submitted papers and proceedings contributions*: 18 items, see the attached list

The congress

As indicated in the previous year report, the main task of the Doppler Institute in 2009 was to organize the *16th International Congress on Mathematical Physics*. It convened on August 3–8, 2009, in the Clarion Congress Hotel in Prague with the attendance of 618 registered participants, among them almost all DI members; it was preceded by the *Young Researcher Symposium* on July 31 – August 1. The congress attracted participants from practically all leading research centres in mathematical physics worldwide and presented a broad panorama of the field; its lectures and discussions provided numerous

inspirations for further work. A complete information about the ICMP can be found at <http://www.icmp09.com/>.

Other meetings

1. 18th Student Winter School on *Mathematical Physics*, Horní Polubný, January 25–21, 2009; about 35 participants from DI, Masaryk University Brno and University of Bialystok; seven lectures of DI members and a number of student presentations were heard.
2. *Quantization Day II*, Prague, March 24, 2008; about 20 participants from four countries and ten talks
3. Microconference *Analytic and algebraic methods in physics V*, Prague, May 27–28, 2009; about 20 participants from eight countries and 16 talks
4. A Spring School *Combinatorics on Words*, Děčín, May 31 – June 6, 2009; 15 participants from DI, 10 lectures

Seminars

Four regular seminars worked:

1. *Doppler Institute Seminar*, 13 sessions in 2009
2. *Quantum Circle Seminar*, 14 sessions apart from the workshops
3. *Combinatorial and Algebraic Structures Seminar*, 22 sessions apart from the workshops
4. A *microseminar* on quantum theory and related topics and methods, 9 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. Nine Council members were present at the ICMP and used this opportunity to exchange opinions.
2. *The present report* was discussed and approved electronically

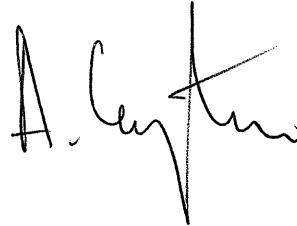
The Václav Votruba Prize

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 *Ľudovít Lipták* for the work entitled “Aspects of thermodynamics nad confinement in the lattice formulation of QCD”; honorable mentions were given to *Ľubomíra Balková* and *Hynek Bíla*.

Signed in Prague and London on December 22, 2009



Pavel Exner
DI Scientific Director



Ari Laptev
DI Council Chairman