

Doppler Institute

for Mathematical Physics and Applied Mathematics

2015 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 17 members the salaries of whom were payed by the three participating institutions, CTU (Exner-part, Havlíček, Jex, Masáková, Pelantová, Šnobl, Šťovíček, Tolar, Chadzitaskos, Pošta), NPI (Exner-part, Znojil, Dittrich, Krejčířík, Tater) and UHK (Šeba, Kříž, Jezbera).
2. *Temporary positions* covered by various grant, institutional, and European sources were given to postdocs, some of them continuing from the previous year: Barseghyan, Gábris, Háková, Hamilton, Lotoreichik, Manko, Minakov, and Ohya.
3. *Students*: the DI members supervised PhD studies of 13 students, of which 11 were based at the CTU and two in the NPI; a part of the theses was prepared in collaboration with institutes abroad. In addition, a number of undergraduate students were supervised.

4. *Degrees obtained:* Daniel Vařata defended in June *PhD thesis* entitled “Modelling of social systems” written under supervision of P. Šeba. In November Ľubomíra Balková obtained her habilitation and Zuzana Masáková qualified for a full professor position.
5. *Awards:* Pavel Exner obtained the first degree *Faculty Medal* for leading the Institute. Daniel Dombek obtained *Antonín Svoboda Prize* for best 2014 thesis in cybernetics and informatics.
6. *Visitors:* About 25 people visited DI from abroad for collaboration purposes, typically with a talk given at one of the DI seminars.

Publications

1. *Non-journal publications:* a monograph on quantum waveguides, an edited volume, and three book chapters.
2. *Research papers:* there were 51 journal papers published, of which 37 of this year while 14 were accepted earlier and published in 2015. In addition there were 14 papers accepted; a full list is attached. The spectrum of journals in which we published was wider than in previous years. There were nine papers in *J. Phys. A: Math. Theor.*, five in *Phys. Rev. A*, three *Int. J. Theor. Phys.* and *Phys. Rev. D*, two in *Ann. Phys.*, *J. Math. Phys.* and *J. Number Theory*, and single papers in *Int. Eqs Oper. Theory*, *J. Diff. Eqs*, *J. Math. Anal. Appl.*, *J. Phys.: Conf. Ser.*, *J. Spect. Theory*, *Lett. Math. Phys.*, *Phys. Lett. A*, *Russ. J. Math. Phys.*, *Trans. AMS*, and sixteen other journals.
3. *Submitted papers and proceedings contributions:* altogether 31 items, see the attached list

Meetings

1. 24th *Student Winter School on Mathematical Physics*, Janské Lázně, January 25–31, 2015; about 35 participants from three countries, 26 talks
2. Student Conference on *Combinatorics on Words and Mathematical Physics*, Zlaté Hory, May 31 – June 6, 2015; about 25 participants
3. Workshop *Mathematical aspects of physics with non-self-adjoint operators*, Palo Alto, June 8–12, 2015; 23 participants from six countries, ten talks

4. 27th Indian Summer School *Graphene, the bridge between low and high energy physics*, Prague, September 14–18, 2015; about 60 participants from 13 countries, seven courses

Seminars

Four regular seminars worked:

1. *Doppler Institute Seminar*, 11 sessions in 2015
2. *Quantum Circle Seminar*, 14 sessions
3. *Combinatorial and Algebraic Structures Seminar*, 13 sessions apart from the workshops
4. *MAFIA Seminar*, 11 sessions
5. A *microseminar* on quantum theory and related topics and methods, 2 sessions

Václav Votruba Prize

In the thirteenth year of competition for the best PhD thesis in theoretical physics the award went to *Jan Vysoký* from the Czech Technical University for the work *Geometry of membrane sigma models*. The jury also gave a honourable mention to *František Štampach* for the work *Spectral analysis of Jacobi matrices and related problems*.

Prague, December 29, 2015



Pavel Exner
DI Scientific Director