

Doppler Institute

for Mathematical Physics and Applied Mathematics

2018 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>

Funding

After seven lean years following the Center of Basic Research period, the Doppler Institute is since August 2018 supported by the five-year European Union project ‘Center of Advanced Applied Sciences’ together with several other departments of the Czech Technical University

People

1. *Permanent staff* consisted of 27 members the salaries of whom were payed by the three participating institutions, CTU (Ambrož, Chadzitasos, Dvořáková, Exner–*part*, Gábris, Hamilton, Havlíček, Jex, Krejčířík–*part*, Masáková, Pelantová, Pošta Šnobl, Štoviček, Štefaňák, Tolar, Tušek), NPI (Barseghyn, Exner–*part*, Dittrich, Jakubský, Krejčířík–*part*, Lotoreichik, Tater, Znojil) and UHK (Jezbera, Kříž, Lipovský, Šeba).
2. *Temporary positions* covered by various grant and institutional sources were given to postdocs and external collaborators, namely Cossetti, Ibrogimov, Lotoreichik, Vandomme, and Turek.
3. *Students*: the DI members supervised PhD studies of 12 students, of which 1 were based at the CTU, two in the NPI and one at the UHK; a part of the theses was prepared in collaboration with institutes abroad. In addition, a number of undergraduate students were supervised.

4. *Degrees obtained:* After a successful habilitation, *Martin Štefaňák* was promoted in November to associate professor. In February *Iva Bezděková* defended a PhD thesis entitled “Quantum walks with point spectrum” written under the supervision of Igor Jex. In October *Radek Novák* defended at l’Université de Nantes a PhD thesis entitled “Mathematical analysis of quantum mechanics with non-self-adjoint operators” written under supervision of David Krejčířík and Xue Ping Wang.
5. *Other personalia:* On November 2 *Miloslav Havlíček*, the founder of the Doppler Institute, celebrated his 80th birthday. At the end of the year *Pavel Exner* concluded his four-year term as President of the *European Mathematical Society*, in November he was elected chair of the Physics & Engineering Section of *Academia Europaea*
6. *Visitors:* About 20 people visited DI from abroad for collaboration purposes, typically with a talk given at one of the DI seminars.

Publications

1. *Research papers:* there were 52 journal papers published, of which 39 of this year while 13 were accepted earlier and published in 2017. In addition there were 16 papers accepted; a full list is attached. The spectrum of journals in which we published was wider than ever. There were five papers in *Phys. Rev. A*, three in *J. Math. Phys.*, two in *Ann. Phys.*, *Ann. H. Poincaré*, *Eur. J. Phys. Plus*, *J. Funct. Anal.*, *J. Phys. A: Math. Theor.*, *J. Russ. Laser Res.*, *Lett. Math. Phys.*, *Mod. Phys. Lett. A*, *Phys. Lett. A*, *Rep. Math. Phys.*, and single papers in *Asympt. Anal.*, *CR Math.*, *J. d’Anal. Math.*, *J. Mat. Pur. Appl.*, *J. Mod. Optics*, *J. Spect. Theory*, *J. Stat. Phys.*, *Science Advances*, and sixteen other journals.
2. *Submitted papers and proceedings contributions:* altogether 23 items, see the attached list

Meetings

1. 27th *Student Winter School on Mathematical Physics*, Janské Lázně, January 21–27, 2018
2. Student Conference on *Combinatorics on Words*, Janov nad Nisou, June 17–21, 2018

3. *Analytic and algebraic methods in physics XV*, Prague, September 10–13, 2018; 48 participants from 14 countries, 34 talks

Seminars

Four regular seminars worked:

1. *Doppler Institute Seminar*, 8 sessions in 2018
2. *Quantum Circle Seminar*, 10 sessions
3. *Combinatorial and Algebraic Structures Seminar*, 20 sessions apart from the workshops
4. *MAFIA Seminar*, 14 sessions
5. A *microseminar* on quantum theory and related topics and methods, 3 sessions

Václav Votruba Prize

In the sixteens year of competition for the best PhD thesis in theoretical physics the award went to *Tomáš Husek* from the IFIC Valencia for the work *Some aspects of the low-energy QCD at the precision frontier*.

Prague, January 1, 2019



Pavel Exner
DI Scientific Director