

Doppler Institute

for Mathematical Physics and Applied Mathematics

2019 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 28 members the salaries of whom were payed, fully or partially, by the three participating institutions, namely CTU (Ambrož, Chadzitaskos, Dvořáková, Exner-*part*, Gábris, Hamilton, Havlíček, Jex, Masáková, Pelantová, Pošta, Šnobl, Štoviček, Štefaňák, Tolar, Tušek), NPI (Barseghyan, Exner-*part*, Dittrich, Jakubský, Lotoreichik, Tater, Turek, Znojil) and UHK (Borisov, Jezbera, Kříž, Lipovský, Šeba).
2. *Temporary positions* covered by various grant and institutional sources were given to postdocs and external collaborators, namely Baradaran, Cassano, Dolce, Ibrogimov, Parhshina.

3. *Students*: the DI members supervised PhD studies of 15 students, of which 11 were based at the CTU, two in the NPI, one at the UHK, and one at the Ostrava University. In addition, a number of undergraduate students were supervised.
4. *Other personalia*: *Vladimir Lotoreichik* was awarded the *Neuron prize* in mathematics.
5. *Visitors*: Over twenty 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 44 journal papers published, of which 31 of this year while 13 were accepted earlier and published in 2019. In addition there were 18 papers accepted; a full list is attached. The spectrum of journals in which we published was again wide. There were four papers in *J. Phys. A: Math. Theor.*, *J. Phys.: Conf. Ser.*, and *Phys. Rev. A*, two in *El. J. Lin. Alg.*, *J. Math. Anal. Appl.*, *J. Math. Phys.*, *J. Math. Sci.*, *Theor. Comp. Sci.*, and single papers in *Ann. Phys.*, *Arch. Math.*, *Eur. J. Phys. Plus*, *J. Diff. Eqs*, *J. Funct. Anal.*, *Lett. Math. Phys.*, *Phys. Rev. Lett.*, *Rep. Math. Phys.*, *SIAM J. Math. Anal.*, and thirteen other journals.
2. *Submitted papers and proceedings contributions*: altogether 28 items, see the attached list

Meetings

Including both held in the Doppler Institute and belonging to the DI traditional conference series:

1. 28th *Student Winter School on Mathematical Physics*, Janské Lázně, January 27–February 2, 2019; 22 participants from Czechia and Poland with the same number of talks
2. \mathcal{PT} -Symmetry and Physics with Non-Hermitian Hamiltonians (PHHQP XIX), Sanya, Hainan province of China, March 18–22, 2019; 50 participants, 44 talks
3. Workshop *Shape Optimization with Surface Interactions*, San Jose, California, June 17–21, 2019; 23 participants from 6 countries, 10 talks

4. *QMath14: Mathematical Results in Quantum Physics*, Aarhus, August 12-16, 2019; 148 participants from 24 countries, 9 talks
5. *Analytic and Algebraic Methods in Physics XVI*, Prague, September 10-13, 2019; 50 participants from 17 countries, 35 talks

Seminars

Four regular seminars worked:

1. *Doppler Institute Seminar*, 10 sessions in 2019
2. *Quantum Circle Seminar*, 12 sessions
3. *Combinatorial and Algebraic Structures Seminar*, 22 sessions apart from the workshops
4. *MAFIA Seminar*, 20 sessions
5. A *microseminar* on quantum theory and related topics and methods, 3 sessions

Václav Votruba Prize

In the seventeens year of competition for the best PhD thesis in theoretical physics the award went to *Andrea Giusti* from the Bishop's University for the work *On the corpuscular theory of gravity*. The jury also honourable mentions to Ondřej Hruška and Miloslav Rapčák.

Prague, December 31, 2019



Pavel Exner
DI Scientific Director