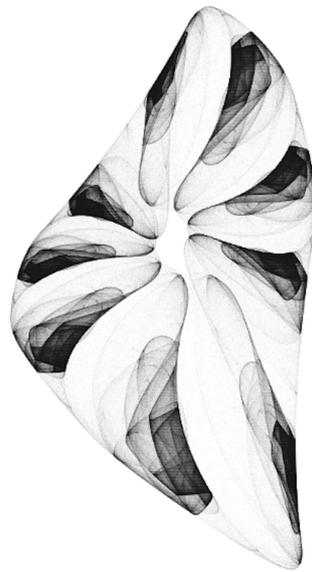


Proceedings of the  
9th Workshop on Quantum Chaos  
and Localisation Phenomena

Warsaw, Poland, May 24–26, 2019



P R O  
PHYSICA



Patronage of Polish Physical Society

*Editors of the Proceedings:*

Leszek Sirko  
Szymon Bauch

WARSAW

---

POLISH ACADEMY OF SCIENCES  
INSTITUTE OF PHYSICS

**The Conference was organized by:**

- Institute of Physics, Polish Academy of Sciences
- Center for Theoretical Physics, Polish Academy of Sciences
- Pro Physica Foundation

**Organising Committee:**

Szymon Bauch	<a href="mailto:bauch@ifpan.edu.pl">bauch@ifpan.edu.pl</a>
Małgorzata Białous	<a href="mailto:bialous@ifpan.edu.pl">bialous@ifpan.edu.pl</a>
Marek Kuś	<a href="mailto:marek@cft.edu.pl">marek@cft.edu.pl</a>
Michał Ławniczak	<a href="mailto:lawni@ifpan.edu.pl">lawni@ifpan.edu.pl</a>
Paweł Masiak	<a href="mailto:pmasiak@ifpan.edu.pl">pmasiak@ifpan.edu.pl</a>
Adam Sawicki	<a href="mailto:a.sawicki@cft.edu.pl">a.sawicki@cft.edu.pl</a>
Leszek Sirko ( <i>Chairman</i> )	<a href="mailto:sirko@ifpan.edu.pl">sirko@ifpan.edu.pl</a>
Jerzy Wrochna	<a href="mailto:wrochna@ifpan.edu.pl">wrochna@ifpan.edu.pl</a>
Vitalii Yunko	<a href="mailto:yunko@ifpan.edu.pl">yunko@ifpan.edu.pl</a>

**Objectives:**

- To assess achievements and to formulate directions of new research on quantum chaos and localisation.
- To bring together prominent experimental and theoretical physicists, who share a common interest in quantum chaos and localisation phenomena.

**Scope:**

Presentations will focus on the following topics:

- quantum chaos and nonlinear classical systems,
- quantum and microwave billiards,
- quantum and microwave graphs,
- atoms in strong electromagnetic fields — experiment and theory,
- chaos vs. coherent effects in multiple scattering,
- Anderson localisation,
- random lasers,
- quantum chaos and quantum computing,
- entanglement and noise.

## Preface

The 9th Workshop on Quantum Chaos and Localisation Phenomena was held in Warsaw, Poland, from 24th to 26th of May, 2019 in the Institute of Physics of the Polish Academy of Sciences. The Workshop was organized by the Institute of Physics of the Polish Academy of Sciences, the Center for Theoretical Physics of the Polish Academy of Sciences and the Foundation “Pro-Physica”. The first of these biennial workshops was organized in 2003. The selected articles of the invited lecturers, starting from the second Workshop, were published in *Acta Physica Polonica A* [1–7]. The main objectives of the Workshops are the assessment of achievements and the formulation of directions of a new research on quantum chaos and localisation phenomena.

The Workshop gathered about 40 participants from China, Czech Republic, Finland, France, Germany, India, Poland, Sweden, United Kingdom, and USA, representing experimental and theoretical physicists. Almost half of them were PhD students and postdocs. The lectures were also attended by not registered researchers and PhD students of the Institute of Physics and Center for Theoretical Physics. During the meeting 16 invited lectures and 6 posters were presented. The presentations were focused on the following topics: quantum chaos and non-linear classical systems, quantum and microwave graphs and billiards, localisation phenomena, topological effects, and physics of low dimensional systems. In the talks and poster presentations the theoretical and experimental problems from various fields of solid state, atomic and molecular, mathematical and statistical physics were discussed. It is noteworthy that, although most of the lectures were devoted to the theory of quantum chaos and many-body systems, there were also very interesting new topics, such as topological effects and the use of machine learning techniques in quantum chaos. The poster session, as well as the coffee breaks and the conference dinner, gave the opportunity for many interesting scientific discussions.

On behalf of the organizers we would like to express our gratitude to all speakers and the authors of the poster presentations for their contribution to the success of the Workshop.

We present the Proceedings of the 9th Workshop on Quantum Chaos and Localisation Phenomena in which 12 invited articles of the Workshop participants are published.

The workshop organizers acknowledge a financial support from the Ministry of Sciences and Higher Education (decision No. 800/P-DUN/2019).

*Editors of the Proceedings*

Leszek Sirko

Szymon Bauch

- [1] L. Sirko, S. Bauch, *Acta Phys. Pol. A* **109**(1), (2006)
- [2] L. Sirko, S. Bauch, *Acta Phys. Pol. A* **112**(4), (2007)
- [3] L. Sirko, S. Bauch, *Acta Phys. Pol. A* **116**(5), (2009)
- [4] L. Sirko, S. Bauch, *Acta Phys. Pol. A* **120**(6-A), (2011)
- [5] L. Sirko, S. Bauch, *Acta Phys. Pol. A* **124**(6), (2013)
- [6] L. Sirko, S. Bauch, *Acta Phys. Pol. A* **128**(6), (2015)
- [7] L. Sirko, S. Bauch, *Acta Phys. Pol. A* **132**(6), (2017)