

**Report of the Evaluation Committee
on scientific activities of the Institute of Physics in Opava, Silesian University in
Opava
(public part of the report)**

Evaluation committee

The Evaluation Committee (EC) consisted of the following persons:

Chair: **prof. Dr. Andrej Čadež, Professor Emeritus**
Faculty of Mathematics and Physics, University of Ljubljana

Members: **prof. Tomasz Bulik**
*Nicolaus Copernicus Astronomical Center of the Polish Academy of Sciences
Astronomical Observatory, University of Warsaw,*

prof. Jorge A. Rueda Hernandez
*International Center for Relativistic Astrophysics Network (ICRANet)
University of Ferrara*

Secretary: **doc. RNDr. Jiří Kovář, Ph.D.** (not member of EC)
Institute of Physics in Opava, Silesian University in Opava

Scope of the evaluation

The evaluation applies to:

- (1) the institute's conception of research activities in general;
- (2) the individual members of the research centers of the Institute of Physics in Opava (IoP), i.e. Research Center for Theoretical Physics and Astrophysics (RC TPA) and Research Center for Computational Physics and Data Processing (RC CPDP).

Goal of the evaluation

EC was asked to provide:

- (1) an overall evaluation of the conception of the institute's scientific activities separated into two research centers, including possible specific recommendations towards conceptual or organizational changes for its further development;
- (2) evaluation of members of the research centers of IoP from the point of view of their contribution towards the excellence of the scientific activities of IoP - publication productivity and quality, level of international cooperation or their overall perspective („scientific promise”) for further development of scientific activities of IoP.

The outcome of the task (2) was a ranking of the evaluated members into 5 categories (whose number was left to the committee's judgment - at least 3) according to their performance, from the best to the worst.

Both full-time and part-time academic and scientific employees of IoP assigned to both research centers were evaluated, with the exception of doctoral students. However, curriculum vitae of doctoral students were also provided for the use of EC regarding task (1).

Attention is paid to the period time 2017-2021.

Overall evaluation of the conception of the Institute's research activity and activities of its research centers

The Institute of Physics is divided into two research centers devoted mostly to relativistic astrophysics but also including particle physics and astronomical observations. The Committee is impressed by the effort and the quality of research reached by the centers, especially noting that it is a very young institution. The publication record of the Institute is increasing over years with outstanding pace. Relativistic astrophysics in Opava has reached a global visibility. We also appreciate the influence the Institute has on the general public in Opava. The outreach activities that promote science are commendable and enrich the scientific culture of the wider community.

The Committee appreciates the number of grants obtained by the Faculty members and encourage all Faculty members to submit grant applications.

The Research Center for Theoretical Physics and Astrophysics is an institution with respectable scientific output. There are 19 faculty members and four of them can lead PhD students. It is expected that at least two faculty members: Dr Konoplya, and Dr Kolos will obtain habilitation in the near future. Therefore the center will have a stable core of independent researchers capable of leading research groups.

The Research Center for Computational Physics and Data Processing is smaller with the staff of 8 researchers out of which three are potential PhD supervisors. One researcher - Dr Urbanec is close to applying for habilitation. However, the center as it is now, seems not to live up to its name and ambitions - the center should do data analysis, data mining, and solve physics problems with numerical methods. To realize this, the center would need to obtain its own reasonably powerful computer resources appropriate for their research purposes as well as staff skilled in using the related advanced software.

At the moment, the topics that are developed in the Center largely overlap with the work done in RCfTPaA. The center does not have its separate scientific identity. Our suggestion is that either the two centers merge or the Center for Computational Physics and Data Processing redefines its activity to match the name and scope as described in the Self-Evaluation Document. If the Centers are merged then the new larger entity would provide a good environment for the development of research groups led by young leaders.

The set of research topics developed by the two centers revolves around a few topics: QPOs and their models, accretion disks, geodesic motion and compact stars modeling. The researchers at the Institutes possess unique skills to solve complicated problems in relativistic astrophysics. However, the Committee notes that the problems are treated as mathematical challenges and are often not subject to observational tests. In our opinion, the research at the Institutes should be more often confronted with observational data. Such comparisons are essential to approach the strategic goal of working in multi-messenger astrophysics.

The Committee also suggests that the institute should find a set of problems in which they would play a leading role. For example, the expertise in accretion disk studies could lead to fruitful discussions

with experimental groups working with X-ray satellite data. This could make the Institute a visible player in the field.

We have noted that the duration of PhD projects extends in many cases well beyond 4-years. This is a problem since the doctoral projects may become detached from dynamics of science in the given scientific field. Additionally, doctoral students staying at the Institute well beyond 4 years are put at a disadvantage on the science job market. Furthermore, the situation is counterproductive with respect to the development of the institute, since it slows down the personal growth of PhD candidates as well as of the research staff.

The Committee appreciates the activity of the Institute in organizing conferences and workshops. This enhances the visibility of the Institute and increases the feeling of being a part of the world astrophysical community. This is especially important in a relatively small and young institution. We stress the importance of the weekly seminar series as it facilitates the collaboration within the Institute and we encourage continuation or even extension of this activity.

The Committee was made aware of a good academic environment and conditions for PhD students. The good relationship extends also to relations between students and research staff. Students have access to scientific literature and they stress the importance of regular student seminars, journal club and similar activities. Students also expressed lacking of exposure to observational astrophysics and data analysis.

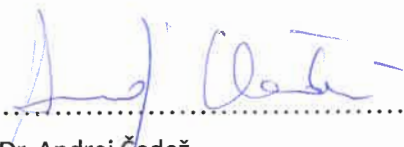
The Committee suggests that the Institute adds a course on astrophysical instrumentation, astrophysical databases and data analysis to the curriculum.

**Evaluation of the individual members
of the research centers of the Institute of Physics in Opava**

It is the view of the Committee that the success of a scientific team depends strongly on the chemistry between team members. This is driven by the will and desire to discover new laws of nature, new phenomena, as well as the ability of the team as a whole to have the mental power and logistic support to follow the path planned by leaders. Therefore, we decided to provide descriptive evaluation of individuals with grades which should be considered as private and confidential. Our grading was based on the premise that a well performing scientist obtains a grade of 2. We have given the grade 1 to the excelling scientists, while the scientists who need assistance in their career were given a grade 3. Overall we are of the opinion that the centers perform well. This is illustrated by the summary statistics of the grades:

	RC TPA	RC CPDP	Total
Grade 1	6	1	7
Grade 2	9	5	14
Grade 3	4	0	4

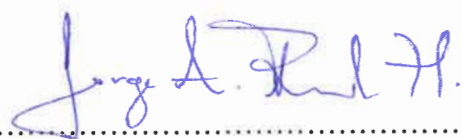
In Opava, April 28, 2022

A handwritten signature in blue ink, appearing to read 'Andrej Čadež', written above a dotted line.

prof. Dr. Andrej Čadež

A handwritten signature in blue ink, appearing to read 'Tomasz Bulik', written above a dotted line.

prof. Tomasz Bulik

A handwritten signature in blue ink, appearing to read 'Jorge A. Rueda', written above a dotted line.

prof. Jorge A. Rueda