

REPORT of the REVIEWING COMMITTEE

to the proposal to award

Mgr. Mario Ziman PhD

by the title *docent* of

Informatics

Committee:

Chair:

Prof. RNDr. Jozef Gruska, DrSc. (FI MU Brno)

Members:

Prof. Caslav Brukner Dr. (Universität Wien),
Prof. RNDr. Miloslav Dušek Dr. (Palacky University, Olomouc);
Prof. Mgr. Tomáš Tyc PhD. (PřF MU, Brno),
Prof. RNDr. Jiří Wiedermann DrSc. (Institute of Informatics, CAS, Prague).

The committee has reviewed, on the basis of the received documents and other information, the scientific and pedagogical achievements of Mgr. M. Ziman, as well as his habilitation thesis and his services to the academic community, as follows:

Mgr. M. Ziman was born on September 1, 1977. He graduated from the Faculty of Mathematics and Physics of the Comenius University in Bratislava in 2000. He received his PhD from Slovak Academy of Sciences in 2003 by defending the thesis *Entanglement as a structure: applications to quantum information processing*

Mgr. M. Ziman's main permanent position is in the Institute of Physics, Slovak Academy of Sciences, in the Centre for Research in Quantum information. Since 2004 he has also a part-time position at the Faculty of Informatics, Masaryk University.

The candidate submitted habilitation thesis that has been reviewed by three reviewers, all members of the committee. All these reviews have been very positive and not only concerning the submitted thesis, but also of the overall scientific contributions of Mgr. M. Ziman.

In the related documents the candidate made three proposal for his habilitaion talks. The Committee has chosen from them the following one: *Complexity of Physics and Physics of Complexity*. The talk took place on May 18 at the Faculty of Informatics, Masaryk University, Brno. Three members of the committee and in total 28 people attended the talk. The talk

was also recorded, put on the web and this way the talk was available to other members of the Committee and to the whole academic community. An evaluation report of the talk was written by two members of the Committee; prof. M. Dušek and prof. T. Tyc. They were very positive concerning the content of the talk and also concerning the pedagogical performance of Mgr. M. Ziman.

1 Scientific achievements

Research activities of Mgr. M. Ziman resulted in 55 scientific publications that include one monograph and 42 peer reviewed paper in the prestigious scientific journals. He has also published 29 science propagating papers, gave 30 talks at international conferences, including 10 invited talks, had 9 posters and in total he had 68 talks at conferences, workshops, colloquies and seminars.

High scientific quality of publications of Mgr. M. Ziman is also reflected by the number of citations that is 272 by the candidate, and 327 by the WoS at the time this report has been completed.

Scientific activity of Mgr. Ziman has been oriented to several areas of quantum information processing. Some of them are deeply physics oriented and some other deeply informatics oriented. They include a study of general quantum operations and measurements, quantum entanglement and quantum channels, universal quantum programmable processors as well as of several areas of quantum cryptography protocols for encryption, voting, privacy and so on. Of a special importance and quality is his monograph, written in a cooperation with T. Heinossari, in which they introduce and study, in an innovative way, fundamental concepts of quantum information processing.

Conclusion I With respect to the quality and quantity of scientific results Mgr. M. Ziman fulfils fully the requirements for receiving the title *docent* at the Faculty of Informatics, Masaryk University.

2 Pedagogical activities and achievements

Pedagogically is Mgr. M. Ziman active, since 2005, mainly at the Faculty of Informatics of Masaryk University. In the Fall semesters he has had increasingly popular lecture *Selected subjects of quantum mechanics*. In the Spring semester he has cooperated at the lecture *Hot topics in quantum information processing* and during both semesters he has been the most active member of the Quantum Seminar. During Spring semesters he keeps lecturing also at the Faculty of Mathematics, Physics and Informatics of Comenius University.

Mgr.M. Ziman has successfully supervised so far 4 magister thesis and is supervising one PhD thesis.

Mgr.M.Ziman is known as an excellent lecturer who can give, even with minimal preparation, clear and systematic talk on a surprisingly large number of topics and to attract by that much the attention of the audience.

Conclusion II Pedagogical capabilities and performance of the candidate is in the accord with the requirements at the Faculty of Informatics, Masaryk University, for obtaining the title *docent*.

3 Services to academic community

Mgr. M. Ziman has been during the last years also very active in serving academic community in the following three areas.

1. As the deputy head of the Centre for research of quantum informatio at the Institute of Physics of SAV, Mgr. M. Ziman has had very substantial share on the success of this well known research institute and, especially, on the large number of grants, mostly international, they have been able to obtain.

2. As one of the major organizers, Mgr. M. Ziman has made very substantial contribution to the organisation of several workshops and schools for PhD students. In particular he has much contributed to the success of the CEQIP conferences that are being held annually in Moravia since 2004 and organized by a cooperation of quantum information groups of FI MU and IP of SAS.

3. Since 2004, Mgr.M. Ziman has published 29 papers to promote science, especially physics and quantum information processing. For that he has already in 2007 received the special award of the Slovak Academy of Sciences.

Conclusion III Also in the area of services to the academic community Mgr. M. Ziman's performance is fully in the accord with the requirements at the Faculty of Informatics, MU, for obtaining the title *docent*.

4 Habilitation thesis

Habilitation thesis of Mgr. M. Ziman, entitled *Quantum encryption protocols and programmable processors*, is composed of 10 commented scientific papers written or co-authored by Mgr. M. Ziman. Papers have been published in the prestigious scientific journals with concentration on problems related to the programmable quantum processors and quantum protocols such as for dense coding and various cryptographic tasks. The thesis is also accompanied by a nicely written introduction to the quantum information processing that tries to deal with all what is needed in order to understand particular articles. The thesis contain also carefully written introductions to each included article in order to put articles into a broader scientific context. Scientific quality of the thesis is very high and so is its pedagogical presentation. To summarize, the thesis presents a collection of original, sound, and interesting

results that tackle some open problems in theoretical quantum information processing. The thesis also well demonstrates the fact that Mgr. Ziman's work is at the cutting edge science position between physics and informatics. High quality of the thesis, careful formulation of the basic concepts, precise arguments and proofs in the thesis and also in the included papers well demonstrate high scientific erudition of Mgr. M. Ziman.

Conclusion IV The scientific and presentation level of the habilitation thesis of Mgr. M. Ziman is fully in accord with the standard requirements of the Faculty of Informatics, Masaryk University.

5 Conclusion

On the basis of the already mentioned facts, the reviews of reviewers of the habilitation thesis an other information, as well as on the basis of personal experiences, the committee came to the conclusion that Mgr. M. Ziman is a very good, well profiled and internationally much respectable scientist. His pedagogical capabilities, habilitation thesis and the outcomes as well as his activities in the service to the academic community are fully in accord with the requirements of the Faculty of informatics for obtaining the title of docent. Also from a broader European context the proposal to award Mgr. Ziman with the title *docent* can be considered as problem-less.





6 Voting

All 5 members of the committee participated at secret voting. The number of votes in favour...5, against...0, unvalid...0,

7 Final conclusion

After secret voting of all members of the committee, the committee recommends to the Scientific Board of the Faculty of informatics to award Mgr. Ziman by the title *docent*.

Brno.....8.11.2010

Prof. RNDr. Jozef Gruska DrSc. 
Prof. Dr. Caslav Brukner.....
Prof. RNDr. Miloslav Dušek Dr. 
Prof. Mgr. Tomáš Tyc PhD. 
Prof. RNDr. Jiří Wiedermann DrSc. 