Annex No. 11 to the MU Directive on Habilitation Procedures and Professor Appointment Procedures

PUBLIC LECTURE EVALUATION

Masaryk University	
Faculty	Faculty of Science
Procedure field	Condensed Matter Physics
Applicant	Mgr. Ondřej Caha, Ph.D.
Lecture date	21. 2. 2024
Lecture topic	Magnetically doped topological insulators
Persons present (number)	36 on-site, 6 online
Designated evaluators (board members)	prof. Mgr. Dominik Munzar, Dr. (on-site) prof. Ing. Eduard Hulicius, CSc. (on-site) prof. Mgr. Tomáš Kruml, Ph.D. (on-site)

The lecture was attended by forty-two persons (thirty-six on-site and six online), among them all members of the habilitation board and two reviewers of the habilitation thesis: Prof. Story and Dr. Veis. Ondřej Caha started with a brief introduction into the physics of topological insulators and a description of the experimental techniques. This was followed by a fascinating review of experimental results underlying the Nature paper on the large magnetic gap at the Dirac point in Mn doped Bi_2Te_3 (Rienks, Wimmer, Sanchez-Barriga, Caha et al., Nature 576, 2019) and the following Advanced Materials paper on the magnetic gap in $MnSb_2Te_4$ that closes at a fairly high Curie temperature of ca 50 K (Wimmer … Caha et al., Advanced Materials 33, 2021). In this part of the lecture, Caha demonstrated that he is not only an expert in X-ray diffraction techniques but that he has experience in many other techniques (such as electron microscopy, X-ray absorption spectroscopy, magnetic and transport measurements and angular resolved photoemission) and related insights into structural and electronic properties of topological insulators.

Caha answered ca ten questions addressing the role played by the surface termination, magnetic anisotropy (differences between Se and Te compounds), density of states in the band gap due to Mn dopants, methods to determine Mn concentration, correlations between the degree of disorder of the Mn dopants and magnetic and topological properties of the films, specific features of the MBE systems at JKU Linz as compared to other systems, observations of defects in the layered structures via electron microscopy, different regimes of magnetic measurements and remaining steps to be performed to obtain the anomalous quantum Hall effect, and the answers were exhaustive. The presentation was a little too informal, e.g., it did not include all references to Caha's publications, from which the figures were taken. Caha should have stated more clearly, what was his own contribution and what was obtained by his collaborators.

Conclusion

The lecture delivered by Ondřej Caha as a part of the habilitation procedure **demonstrated** sufficient scholarly qualifications and pedagogical capabilities expected of applicants participating in a habilitation procedure in the field of Condensed Matter Physics.

The lecture took place in a hybrid form and started at 11 a.m. The above-mentioned members of the board attended the lecture and provided its evaluation. All designated evaluators are familiar with the text and agree with it.

Date: 17. 3. 2024

Dominik Munzar ……..
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Eduard Hulicius ……
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Tomáš Kruml ……
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