

PUBLIC LECTURE EVALUATION

Masaryk University

Faculty

Faculty of Science

Procedure field

Theoretical physics and astrophysics

Applicant

RNDr. Michal Zajaček, Dr. rer. nat.

Lecture date

15. 5. 2025

Lecture topic

Journey from the Galactic center to distant quasars and back

Persons present

(number)

57 present in person and 17 online

Designated evaluators

(board members)

prof. Zoltan Haiman

Dr. Eugene Churazov

prof. Rikard von Unge, Ph.D.

The lecture has literally taken the participants from the Galactic center to distant quasars and back. The speaker introduced stellar and gaseous content in the inner 100 pc of our Galaxy and described the coexistence of stars and gas in this region. The lecture further focused on inner 1 pc of our Galaxy. The lecture further focused on well-known S stars. The study of the orbits of these stars led to a discovery and precise determination of the mass of the supermassive black hole in the center of our Galaxy.

This enabled the speaker to smoothly introduce one of the topics of his own research, which is the study of the central parts of our Galaxy. The applicant contributed to the detection of six additional S stars. The lecture described the methods of detection of additional stars orbiting the central supermassive black hole and discussed the star formation in such an extreme environment. The speaker described his contribution to the study of gas clouds orbiting the supermassive black hole. He further focused on the detection of a first binary in the center of our Galaxy, a study in which he also participated.

The speaker further introduced another field of his research, which is the study of active galactic nuclei. He described the reverberation mapping, which he uses for his research. The applicant described a very promising perspective of radius-luminosity relation and his aim of turning quasars into new "standardizable candles". He finished his lecture by the discussion of the latest jet activity in the center of our Galaxy and its impact on destroying red giants.

At the end of his talk, the speaker answered clearly the questions of the participants.

The lecture has demonstrated strong pedagogical abilities of the applicant. He is able to deliver results of his scientific work in a very clear and broadly understandable way. Furthermore, he succeeded in putting the result of his work in a broader context of cutting-edge research. The lecture can be characterized with the words of one of the referees of his

thesis, Prof. Papadakis, who notes that during the applicant's oral talks at conferences he has "appreciated his intellect, his deep and broad knowledge of both his specific research work and Astrophysics in general".

Conclusion

The lecture delivered by Michal Zajaček, entitled "Journey from the Galactic center to distant quasars and back" and delivered as part of the habilitation appointment procedure, **demonstrated** sufficient scholarly qualifications and pedagogical capabilities expected of applicants participating in a habilitation appointment procedure in the field of theoretical physics and astrophysics.

The lecture took place in a hybrid form at 13:00. The above-mentioned members of the board attended the lecture and provided its evaluation. All designated evaluators are familiar with the text of the evaluation and agree with it.

Date: 15. 5. 2025

prof. Zoltan Haiman

Dr. Eugene Churazov

prof. Rikard von Unge