Approved by the Regents
May 16, 2024

PROMOTION RECOMMENDATION
The University of Michigan
College of Literature, Science, and the Arts

Thomas A. Schwarz, associate professor of physics, with tenure, College of Literature, Science, and the Arts, is recommended for promotion to professor of physics, with tenure, College of Literature, Science, and the Arts.

Academic Degrees:

Ph.D.	2006	University of Michigan
M.S.	2002	University of Michigan
M.S.E.	2001	University of Michigan
B.S.E.	1999	University of Michigan

Professional Record:

2019–present	Associate Professor, Department of Physics, University of Michigan
2012–2019	Assistant Professor, Department of Physics, University of Michigan
2011–2012	Associate Scientist, Fermi National Laboratory
2006–2011	Post-doctoral Associate in Physics, University of California, Davis

Summary of Evaluation:

Teaching: Professor Schwarz demonstrates his commitment to creating inclusive, interactive, and comfortable learning environments by incorporating various teaching techniques, encouraging personal meetings, and utilizing teaching research resources such as CRLT. As a way of fostering inclusivity and connecting with students, he shares personal experiences and emphasizes that learning is a shared journey. Professor Schwarz's design and teaching of a studio format for Physics 240 has received many extremely positive reviews from students and colleagues. As the Department of Physics' first Undergraduate Research Coordinator, Professor Schwarz has played a critical role in creating research opportunities for dozens of students across the many research groups in the department. He has demonstrated exceptional mentorship skills with postdocs, graduate students, and undergraduates, guiding them toward developing their research identities, and encouraging them to take leadership roles.

Research: Professor Schwarz has led impactful research in elementary particle physics. He and collaborators measured Higgs boson production in association with the production of top quarks, which is a critical measurement to test the role the Higgs boson plays in giving mass to the most massive elementary particle, the top quark. He and collaborators have also measured for the first time how the Higgs boson decays to muons, which is critical to understanding the role of the Higgs boson in giving mass to the much lighter leptons. Professor Schwarz has also performed incisive searches for possible new Higgs bosons that are motivated by conjectured resolutions to several outstanding questions that continue to puzzle researchers about the nature of mass generation. In addition to these analysis breakthroughs, Professor Schwarz has played a key role in the delicate and technical upgrades of the ATLAS experiment, which is required to penetrate deeper into the nature of elementary particles.

Recent and Significant Publications:

The ATLAS collaboration, Aad, G., Abbott, B., et al. (2023). Search for resonant and non-resonant Higgs boson pair production in the bbττ decay channel using 13 TeV pp collision data from the ATLAS detector. *Journal of High Energy Physics*, *40*: arXiv: 1808.00336.

The ATLAS collaboration, Aad, G., Abbott, B., et al. (2021). A search for the dimuon decay of the Standard Model Higgs boson in pp collisions at $\sqrt{s}$ = 13 TeV with the ATLAS Detector. *Physics Letters B*, *812*: 135980.

The ATLAS collaboration, Aad, G., Abbott, B., et al. (2020). CP Properties of Higgs Boson Interactions with Top Quarks in the ttH and tH Processes Using H $\rightarrow\gamma\gamma$ with the ATLAS Detector. *Physical Review Letters*, *125*: 061802.

The ATLAS collaboration, Aad, G., Abbott, B., et al. (2018). Observation of Higgs boson production in association with a top quark pair with the LHC at the ATLAS detector. *Physics Letters B*, *784*: 173-191.

Service: Professor Schwarz's service work and leadership roles demonstrate a deep commitment to his students, his department, his field, and the broader community, going beyond standard expectations for an associate professor. Within the university, his service has had a significant focus on undergraduate education and opportunities, notably as the first Undergraduate Research Coordinator for the department, through which he has placed dozens of undergraduates in academic and industry internships, and as the associate chair for undergraduate education. During the pandemic, he served on the UM President and Provost Advisory Council for COVID-19; outside the university, his COVID-19 research and collaborations with the CDC and the State of Michigan reflected his dedication to service to society at large. He has moreover demonstrated significant leadership in his service roles within the ATLAS Collaboration.

External Reviewers:

Reviewer (A): "He has a great sense of what physics topics are interesting and promising in collider physics…"

Reviewer (B): "…[Professor Schwarz] does not shy away from complexity and the results are of very high quality…."

Reviewer (C): "The Schwarz group impact on the top [quark] measurement is clear as one of his graduate students was the contact editor for the internal paper. This is a clear indication of his group's leading role…."

Reviewer (D): "…[Professor Schwarz's] L2 leadership role is especially noteworthy as only the most talented and trusted persons are named to those positions, which require not only top-notch technical skills, but also top-notch management, teambuilding, and leadership skills…."

Reviewer (E): "…Professor Schwarz and his research group have made exceptional contributions to the data analysis, in particular in the investigation of the Higgs boson…I would also like to stress right away that it is rather unique for someone at the Associate Professor level to achieve such high visibility in both the data analysis and in the hardware areas…."

Reviewer (F): "While all publications are authored jointly by all members of the collaborations (as per the rules), there is intense competition within these experiments for producing the best results and for passing the rigorous internal reviews before publication. Prof. Schwarz has consistently been one of the top researchers in ATLAS, initiating new analyses and bringing innovative techniques to bear on the tough problems…."

Summary of Recommendation:
Professor Schwarz has shown the highest intellectual quality, productivity, and leadership in creating and disseminating knowledge in physics. The Executive Committee of the College of Literature, Science, and the Arts and I recommend that Associate Professor Thomas A. Schwarz be promoted to the rank of professor of physics, with tenure, College of Literature, Science, and the Arts.

Anne Curzan, Dean
Geneva Smitherman Collegiate Professor of
English Language and Literature, Linguistics,
and Education
Arthur F. Thurnau Professor
College of Literature, Science, and the Arts

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