TECHNISCHE UNIVERSITÄT DRESDEN

**Bereich Mathematik und Naturwissenschaften** Fakultät Physik

# PHYSIKALISCHES KOLLOQUIUM

*Referent:* **Prof. Dr. Stephen P. Martin**
Northern Illinois University
DeKalb, USA

*Thema:* **Supersymmetry in the Large Hadron Collider era and beyond**

*Zeit und Ort:* Dienstag, 26.1.2021, 16:40 Uhr
Online-Meeting: BBB / Zugang mit Browser (Firefox oder Chrome)
- Teilnehmende mit ZIH-Login über folgenden Link:
https://selfservice.zih.tu-dresden.de/l/link.php?m=68755&p=dc2a3389
- Teilnehmende ohne Hochschul-Login über folgenden Link:
https://selfservice.zih.tu-dresden.de/link.php?m=68755&p=7ac7c441

*Leiter:* Prof. Dr. Dominik Stöckinger

*Kurzfassung:* The discovery of the Higgs boson at the Large Hadron Collider in 2012 completed the structure of the Standard Model of particle physics. However, there are several independent pieces of direct evidence that the Standard Model must be extended to include new particles and interactions. Supersymmetry, which proposes that each known type of fundamental particle has a partner particle with the same interactions but different spin, is an intriguing possibility that can help explain the mass scale of the weak interactions and provides a dark matter candidate. I will discuss the status of supersymmetry after the recent searches at the Large Hadron Collider, and compare it to other hypotheses for what might be the next layer of new physics beyond the current standard model. Another option is that there are new heavy quarks and leptons beyond the known ones. However, experimental evidence shows that these must satisfy a property known as decoupling, and therefore they must be quite different from their Standard Model counterparts. Combining the ideas of supersymmetry and extra quarks and leptons can help explain why the Higgs boson mass is what is observed, and provides exciting new challenges for experimental searches.

*Biographie:* Stephen Martin received his undergraduate degree in physics at the California Institute of Technology and his PhD at the University of California at Santa Barbara in 1984. He enjoyed postdoctoral research positions at Princeton, the University of Florida, Northeastern University, the University of Michigan, and California Santa Cruz. He has been a professor of physics at Northern Illinois University since 1998, where he works on all aspects of physics at the frontier of the Standard Model of particle physics.