



PHYSIKALISCHES KOLLOQUIUM

Referent: **Jun.-Prof. Dr. Gregor Kasieczka**
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Thema: **Faster, deeper, stronger: Machines learn particle physics**

Zeit und Ort: Dienstag, 22.10.2019, 16:40 Uhr
Recknagel-Bau, Hörsaal REC/C213, Haeckelstr. 3

Leiter: Prof. Dr. Arno Straessner

Kurzfassung: Many experimental results from both particle and astrophysics hint that the Standard Model (SM) of particle physics cannot be a complete theory of Nature. However, in its first years of operation, the Large Hadron Collider at CERN was very successful in excluding large regions of parameter space for potential models beyond the SM. We present how deep learning - algorithms based on neural networks with large numbers of internal layers - can be used to search for deviations from the SM. Specifically, we discuss how to efficiently identify hadronically decaying top quarks and how to search for anomalous events in a model-independent way by using deep autoencoders. Beyond searching for new physics, we explore ways to increase the robustness as well as understand uncertainties of network decisions and show how generative models can speed up simulations.

Biographie: Diploma in Physics at TU Wien (2009), PhD from Universität Heidelberg (2013) and Postdoc at ETH Zurich (2013-2017). Since 2017 Junior Professor and since 2018 Emmy-Noether group leader ("Searching for displaced signals of naturalness") at Universität Hamburg. Research is focused on searching for new particles with the CMS experiment at the CERN LHC, exploring interactions of the discovered Higgs boson, and finding creative applications of machine learning to particle physics problems.

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