Karlsruhe Institute of Technology

Collaborative Research Center TRR 257

PH

Particle Physics Phenomenology after the Higgs Discovery

Welcome to the MITP Scientific Program *Particle Physics Phenomenology after the Higgs Discovery* !

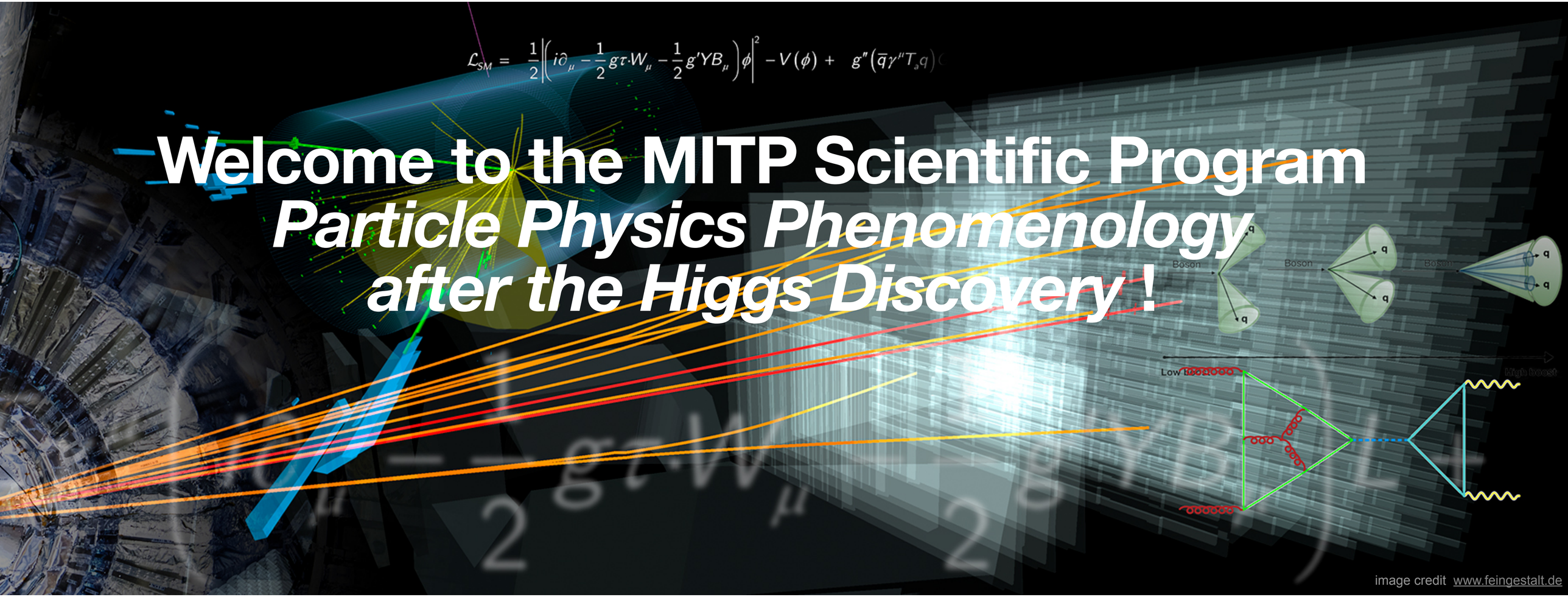


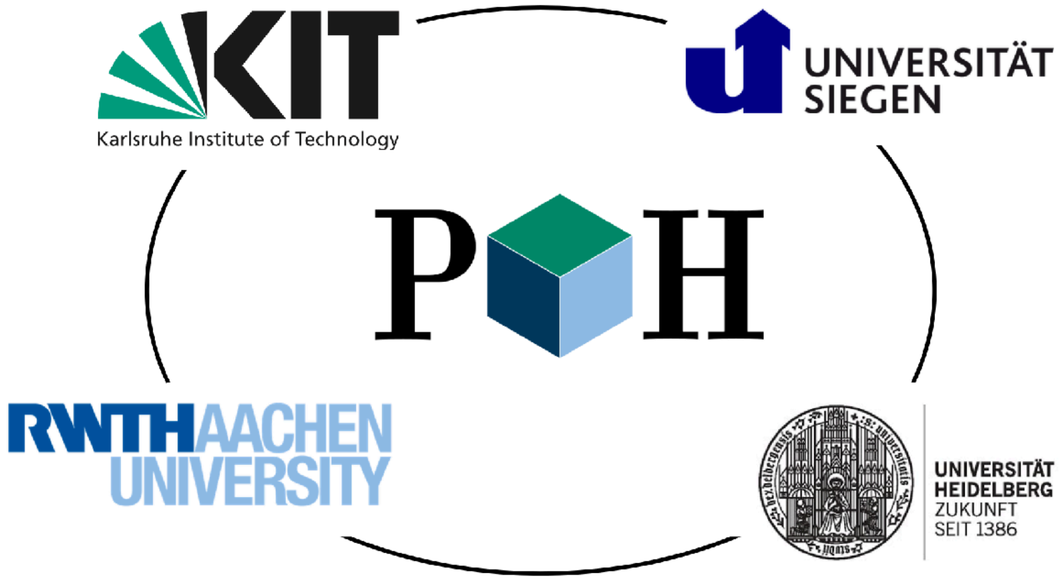
image credit www.feingestalt.de

06.10.2025

P3H stands for

Particle Physics Phenomenology after the Higgs discovery

This is also the title of the **Collaborative Research Center TRR 257**



The CRC TRR 257 is a joint venture of theoretical particle physicists of 3 sites and 1 associate member (HD)
(TRR means "Transregio")

Funded by the German Research Foundation (DFG)

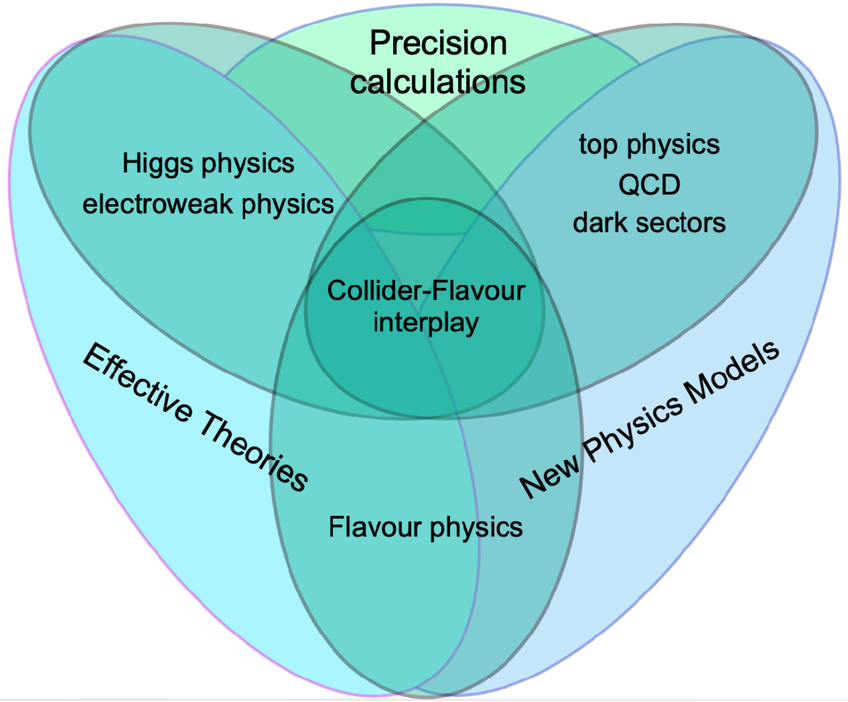
DFG Deutsche Forschungsgemeinschaft

Particle Physics Phenomenology after the Higgs discovery

- The overarching themes of the Collaborative Research Centre are the interplay between collider and flavour physics and precision phenomenology

- These theses are also the central themes of this workshop

- More info at https://p3h.particle.kit.edu/start



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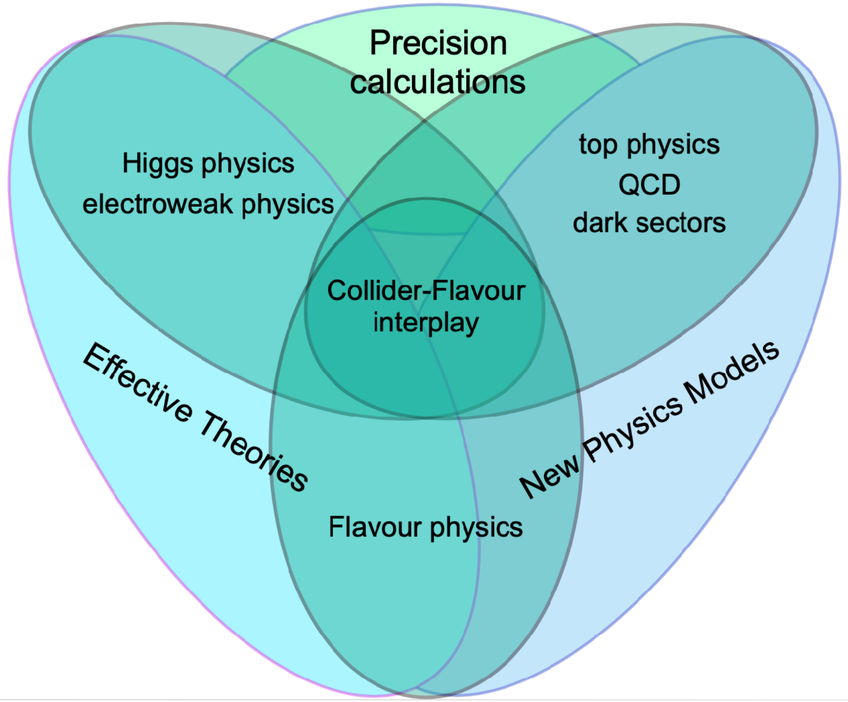
- The CRC is divided into funding periods of 4 years
  - Funding period 1: 01/2019 - 12/2022
    spokesperson: Kirill Melnikov
  - Funding period 2: 01/2023 - 12/2026
    spokesperson: GH



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The Collaborative Research Center was created as a response to the paradigm shift towards **precision physics** as the driving force for **indirect searches** of New Physics.

Main long-term research goal:
development of a **comprehensive framework** to search for, discover and explore physics beyond the Standard Model in a situation where the comparison of **precise theoretical predictions** with equally precise data plays an ever increasing role.

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Therefore, among the main goals of this Workshop is the exchange of ideas how to facilitate a successful precision-based research program at the LHC and beyond.

Some general questions to be discussed

- **What are the perspectives of the field overall?**

  e.g. major shifts towards astroparticles,
  or preparations for future colliders
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- **What are/should be the main goals of the particle physics program until ~2041(end of HL-LHC)?**

  e.g. Higgs potential, Higgs couplings, Higgs width, flavour puzzles,
  dark sectors/axion search, non-collider experiments, …

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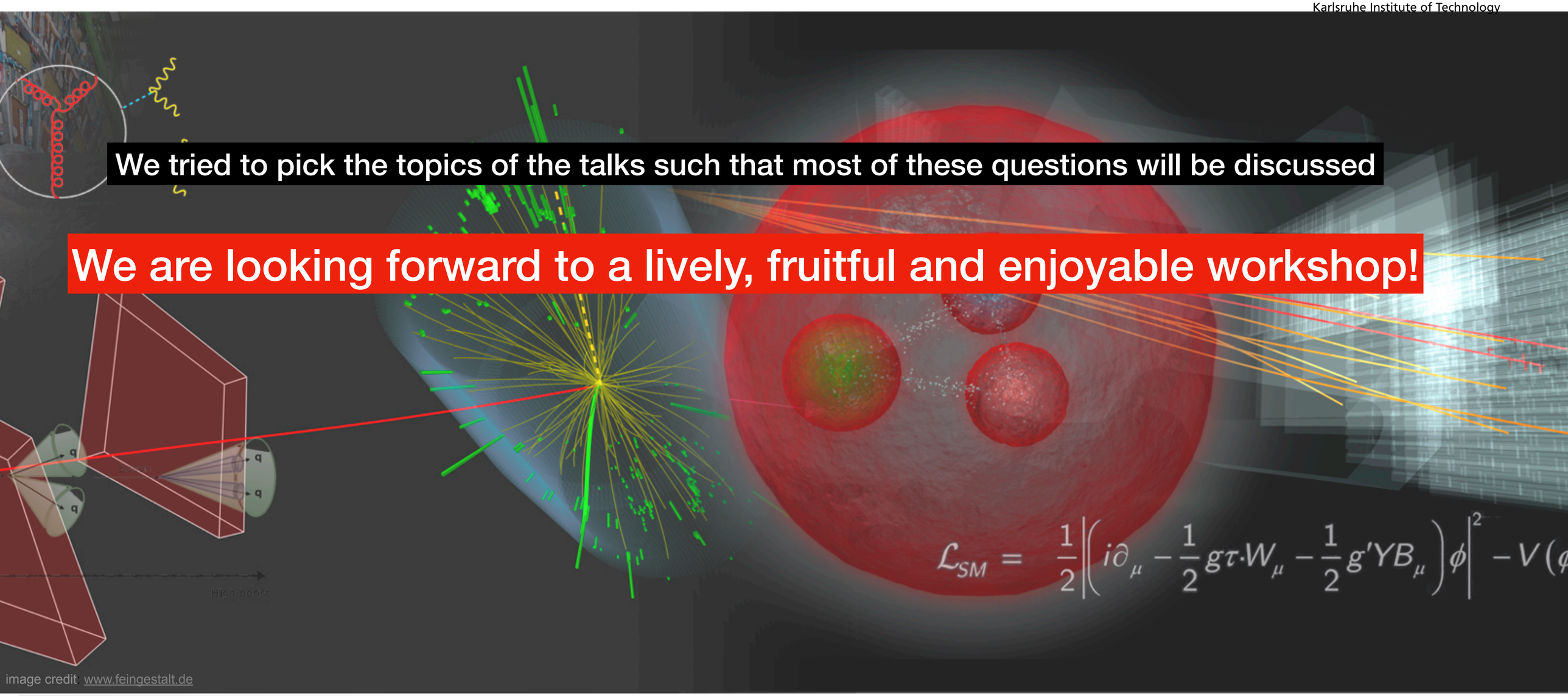
- How can we better combine perturbative and non-perturbative methods to improve QCD predictions?
- How can we best exploit AI methods?
- Will Quantum Computing be useful for particle physics any time soon?


We tried to pick the topics of the talks such that most of these questions will be discussed
We are looking forward to a lively, fruitful and enjoyable workshop!
$\mathcal{L}_{SM} = \frac{1}{2}\left|\left(i\partial_\mu - \frac{1}{2}g\tau\cdot W_\mu - \frac{1}{2}g'YB_\mu\right)\phi\right|^2 - V(\phi$
q
q
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High boost
image credit: www.feingestalt.de