14:00 → 15:35 **Technologies, Algorithms and Computing**

This session will cover technologies, algorithms and computing related topics that are key for AP and PP research.

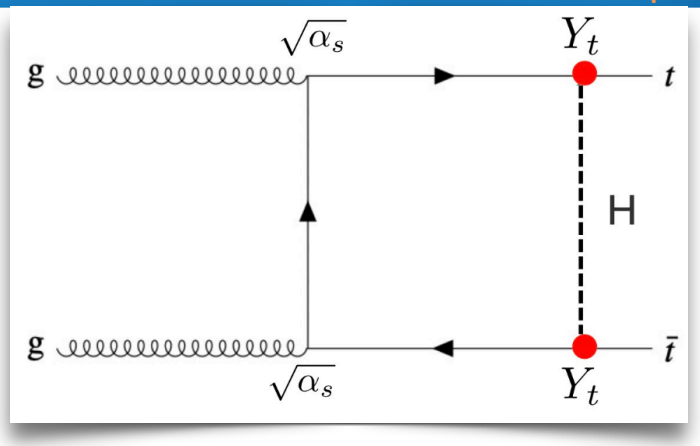
Vorsitzende der Sitzung: Simran Sunil Gurdasani (Z_ATLAS (Experiment ATLAS)), Steven Worm (Z_DET (Detektorentwicklung))

14:00 **Poster Pitches** 5m

Marium
Schwägerl
Stoldt
Lauk

Extracting the Top-Quark Yukawa Coupling with ATLAS Run-2 Data

Sadia Marium| APPP workshop | 6-8 Oct,2025



Motivation

- The top quark is the heaviest fermion, so its Yukawa coupling (gt) is close to 1.
- Measuring it tests the Standard Model and probes new physics.

Impact

- Provides **independent probe** of Higgs-top interactions.
- Sensitive to **BSM effects** in loops beyond direct measurements.

Key Result

- Public results of Y_t in single-lepton channel

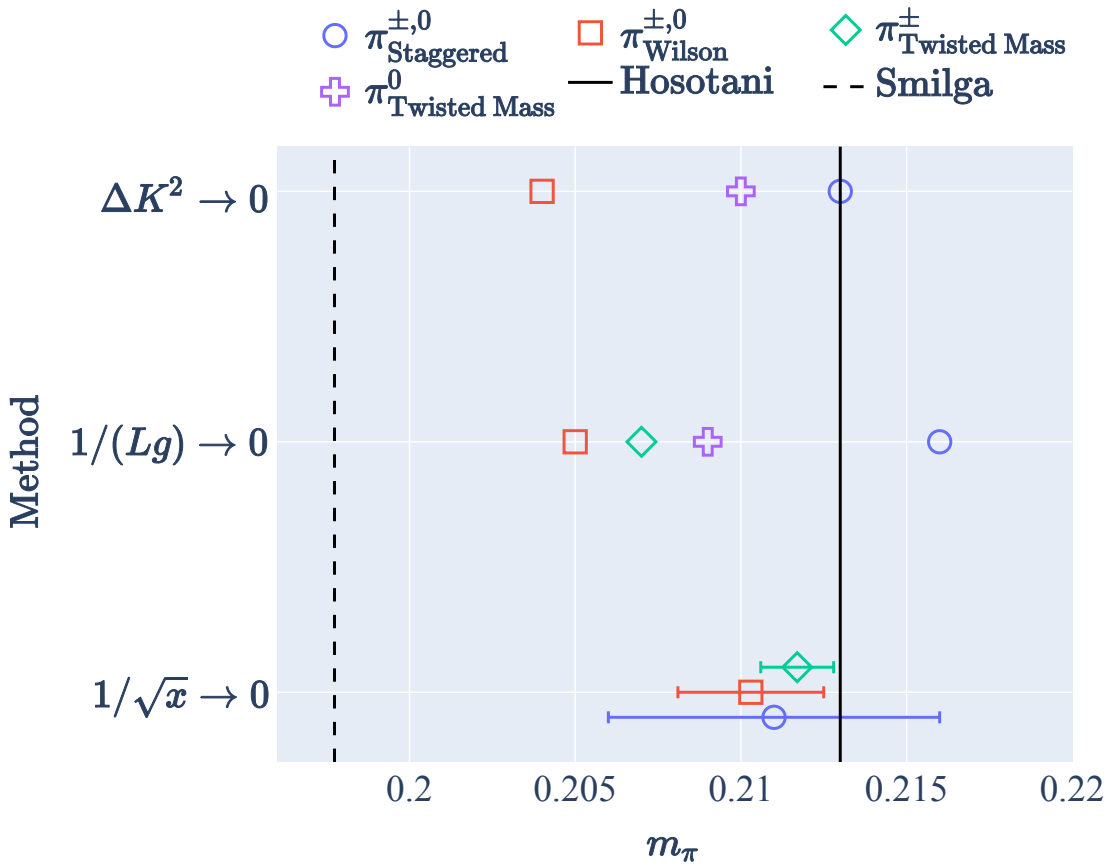
  Extracted Y_t^2 is consistent with the Standard Model.

  95% CL upper limit set on Yt.
- Ongoing analysis in the dilepton channel

Tensor Networks for Lattice Gauge Theory

Tim Schwägerl, Karl Jansen, Stefan Kühn

- Tensor Network study of the massive two-flavor Schwinger model (**QED** in 1+1D).
- **Continuum-scaling analysis** for different fermion discretizations.
- High-precision determination of the **pion mass** and comparison to analytical predictions.

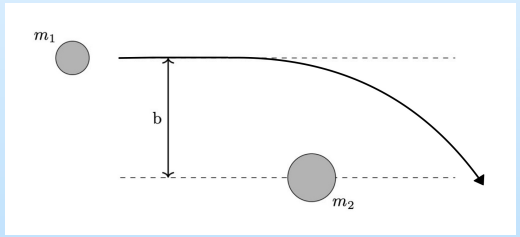


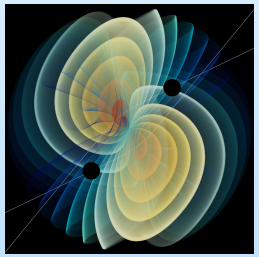
Radiated Angular Momentum in Black Hole Scattering

Radiated angular momentum is an observable relevant in gravitational wave physics

It is non-vanishing only for dissipative effects

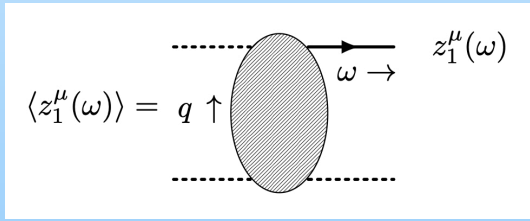
Relation to the impact parameter: $\Delta L = p_\infty |\Delta b|$





Goal: Use Worldline Quantum Field Theory (WQFT) formalism to propose a novel formula to compute Δb_i^μ, providing a new method to obtain ΔL

$$\Delta b_i^\mu = \frac{\partial}{\partial \omega}\left(i\omega^2 \langle z_i^\mu(\omega)\rangle\right)\Big|_{\omega\to 0}$$



Non-trivial $\omega \to 0$ limit ⟶ apply method of regions to Feynman integral families

Calculation at two-loop (3PM) order in progress, building on published one-loop calculation using trajectories [2506.20643]

Non-perturbative renormalization (of the EMT in the 2d O(3) nonlinear sigma model)

with Agostino Patella

How do Symmetries in QFT help us with renormalization?

What is nonperturbative renormalization?

How can we use lattice field theory to perform nonperturbative renormalization?

For a very general audience

Why 2d O(3) nlsm? Why the EMT?

What scheme do we use, what action, how do the cutoff effects look?

What are our simulation parameters, what are the results?

For a not so general audience

Lauk