



INVITATION

Joint Mathematical Physics – Particle Physics Seminar

to the talk by

Prof. Dominik Stöckinger
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on

“Gamma5 in dimensional regularization - progress on non-anticommuting gamma5 and gauge-invariance restoration”

Abstract:

Dimensional regularization is a key method used in Feynman diagrammatic computations in elementary particle theory. Since its earliest days, however, it has been known that the Gamma5 matrix is notoriously difficult to define in D dimensions. The traditional BMHV scheme goes back to the earliest proposals by 't Hooft and Veltman and employs a non-anticommuting gamma5. Its advantage is full mathematical consistency and the existence of all-order proofs. Its disadvantage is the spurious breaking of gauge invariance in chiral gauge theories like the electroweak standard model. In our research programme we determine the required finite counterterms needed to restore gauge invariance, to allow more straightforward applications of the BMHV scheme in future practical calculations in the EWSM and beyond.

In the talk we will first present the key ideas: definition of the problem and pedagogical explanations of breaking/restoration of gauge invariance. Then we outline the current status: the 2-loop to 4-loop treatment of an abelian chiral gauge theory like the U(1) sector of the EWSM, the 2-loop treatment of a general Yang-Mills theory with chiral fermions, and progress towards the electroweak SM.

Time: Tuesday, 18 November 2025, 2:00 p.m.

Location: Erwin-Schrödinger Lecture Hall, 1090 Vienna, Boltzmannngasse 5, 5th floor