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On QED Self-Energies at Higher Loop Orders and Canonical Differential Equations

Wednesday 5 November 2025 15:20 (40 minutes)

The self-energies in Quantum Electrodynamics (QED) are not only fundamental physical quantities, but also well-suited for investigating the mathematical structure of perturbative Quantum Field Theory. In this talk, I will discuss the computation of the QED self-energies through differential equations up to the fourth loop order, where increasingly complicated Calabi-Yau geometries appear. In particular, I will consider contributions to the electron self-energy at four loops, involving a Calabi-Yau threefold, and give an overview of some insights, challenges and open questions.

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