Contribution ID: **211** Type: **Parallel session talk**

Tackling Feynman integrals with quantum minimization algorithms

Tuesday 22 August 2023 16:20 (20 minutes)

One of the most severe bottlenecks to reach high-precision predictions in QFT is the calculation of multiloop multileg Feynman integrals. Several new strategies have been proposed in the last years, allowing impressive results with deep implications in particle physics. Still, the efficiency of such techniques starts to drastically decrease when including many loops and legs. In this talk, we explore the implementation of quantum algorithms to optimize the integrands of scattering amplitudes. We rely on the manifestly causal loop-tree duality, which translates the loop into phase-space integrals and avoids the spurious singularities due to non-causal effects. Then, we built a Hamiltonian codifying causal-compatible contributions and minimize it using a Variational Quantum Eigensolver. Our very promising results point towards a potential speed-up for achieving a more numerically-stable representation of Feynman integrals by using quantum computers.

Collaboration / Activity

None

Primary author: Dr SBORLINI, German Fabricio Roberto (Universidad de Salamanca e IUFFyM)

Presenter: Dr SBORLINI, German Fabricio Roberto (Universidad de Salamanca e IUFFyM)

Session Classification: T11 Quantum Field and String Theory

Track Classification: Quantum Field and String Theory