

Computing amplitudes in QFT: challenges in precision calculations

Monday, 26 May 2025 15:30 (25 minutes)

I review the main aspects of QFT calculations, which affect many fields from HEP phenomenology, cosmology and gravitation. After an overview on amplitudes and Feynman Integrals, I will focus on the computational methods applied in the state-of-the-art results of our field, such as IBPs, tensor reduction, Differential equations, direct integration.

They make use of both symbolical and numerical techniques, with the need of processing multivariate polynomials, solutions of linear systems, large matrices transformations, Monte Carlo methods and non-simple functions as polylogarithms and Bessel functions. I will finally discuss the computational resources needed to tackle nowadays predictions of observables in particle physics.

Primary author: RONCA, Jonathan (Istituto Nazionale di Fisica Nucleare)

Co-authors: MANDAL, Manoj Kumar (Istituto Nazionale di Fisica Nucleare); MASTROLIA, Pierpaolo (Istituto Nazionale di Fisica Nucleare)

Presenter: RONCA, Jonathan (Istituto Nazionale di Fisica Nucleare)

Session Classification: Calcolo teorico e degli esperimenti

Track Classification: Calcolo teorico e degli esperimenti