

DPF-PHENO 2024

Contribution ID: 436

Type: **not specified**

Momentum shift and on-shell constructible massive amplitudes

Thursday 16 May 2024 16:45 (15 minutes)

We construct tree-level amplitude for massive particles using on-shell recursion relations based on two classes of momentum shifts: an all-line transverse shift that deforms momentum by its transverse polarization vector, and a massive BCFW-type shift. We illustrate that these shifts allow us to correctly calculate four-point and five-point amplitudes in massive QED, without an ambiguity associated with the contact terms that may arise from a simple “gluing” of lower-point on-shell amplitudes. We discuss various aspects and applicability of the two shifts, including the large- z behavior and complexity scaling. We show that there exists a “good” all-line transverse shift for all possible little group configurations of the external particles, which can be extended to a broader class of theories with massive particles such as massive QCD and theories with massive spin-1 particles. The massive BCFW-type shift enjoys more simplicity, but a “good” shift does not exist for all the spin states due to the specific choice of spin axis.

Mini Symposia (Invited Talks Only)

Authors: MAHBUB, Ishmam (University of Minnesota Twin Cities); LYU, Kunfeng (University of Minnesota); GAO, Ting (University of Minnesota); KE, Wenqi (University of Minnesota); EMA, Yohei; LIU, Zhen

Presenter: MAHBUB, Ishmam (University of Minnesota Twin Cities)

Session Classification: Quantum Field & String Theory

Track Classification: Quantum Field & String Theory