

Theoretische Teilchenphysik II

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Exercise Sheet 7

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Color-ordered Feynman rules and amplitudes

Calculating processes with many external color particles can be highly complicated in the traditional approach, with squaring a sum of Feynman diagrams constructed with standard QCD Feynman rules. In several following exercises, we aim to develop techniques to make such calculations possible.

Read carefully the first part of the Lectures by Lance Dixon given at the TASI-95 school [Dix96]. Pay attention to the following topics discussed in lectures:

- How do we rewrite structure constants in terms of generators in the fundamental representation?
- What are the benefits of the $U(N)$ extension of the original $SU(N)$ group for color traces simplification?
- How do we use color-ordered Feynman rules containing no information about color particles to construct full amplitude?

Bibliography

[Dix96] L. J. Dixon, *Calculating scattering amplitudes efficiently* in Theoretical Advanced Study Institute in Elementary Particle Physics (TASI 95): QCD and Beyond, pages 539–584 (1996), hep-ph/9601359.