

Problems in Quantum Field Theory 4: Cross sections and Feynman rules

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NOTE: Priority to exercises marked by a “*” will be given during the tutorials.

1. * Calculate the invariant amplitude of Møller scattering, $e^-e^- \rightarrow e^-e^-$ via Wick's theorem and directly from Feynman rules.
2. * Compute the invariant amplitude of $e^+e^- \rightarrow \mu^+\mu^-$.
3. Compute the annihilation cross section for the process $e^+e^- \rightarrow \gamma\gamma$.
4. Compute the invariant amplitude of $e^+e^- \rightarrow \mu^+\mu^-$ via a massive spin-1 boson exchange.