

FY3403 Particle physics
Problemset 6 fall 2024

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Background material: mainly Griffiths chapter 6.

Problem 1. Interaction processes and Feynman diagrams

Draw Feynman diagrams for the following interaction processes (if the process is possible)

- a) $e^- + \mu^- \longrightarrow e^- + \mu^-$
- b) $e^- + \mu^+ \longrightarrow e^- + \mu^+$
- c) $e^- + \mu^+ \longrightarrow e^+ + \mu^-$
- d) $e^- + e^+ \longrightarrow \mu^+ + \mu^-$
- e) $e^- + e^+ \longrightarrow e^+ + e^-$
- f) $e^- + \nu_\mu \longrightarrow e^- + \nu_\mu$
- g) $e^- + \nu_\mu \longrightarrow \nu_e + \mu^-$
- h) $e^- + \nu_e \longrightarrow e^- + \nu_e$
- i) $\tau^- \longrightarrow \mu^- + x$ (replace x by some possible set of particles)
- j) $\nu_e + \nu_\mu \longrightarrow \nu_\mu + \nu_e$