

**FY3403 Particle physics**  
**Problemset 6 fall 2024**

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**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)  $\nu_e + \nu_\mu \longrightarrow \nu_\mu + \nu_e$