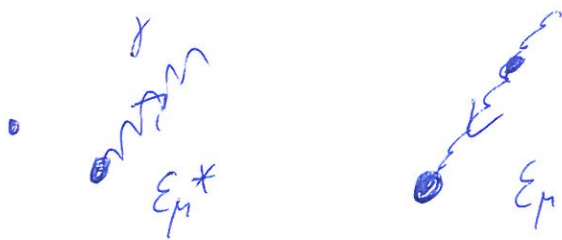
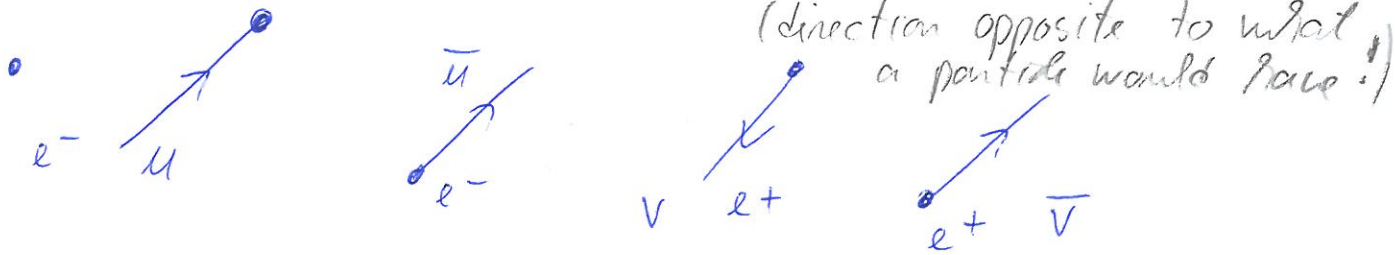


# Feynman - rules:

[these are Feynman rules for  $\mathcal{R}$ ]

- overall factor  $i$ ;  $E-\vec{p}$  conservation at each vertex



$$\frac{i}{p-m}$$

$$\frac{-ig^{\mu\nu}}{q^2}$$

$$ie\gamma_\mu$$

„extra-rules“

- $-1$  for closed fermion loop
- $\int \frac{d^4q}{(2\pi)^4}$  for closed loops
- $(-1)$  relative factor for graphs that differ by interchange of 2 identical fermion lines
- Symmetry factor  $S$ ;
  - ↳ # of times one can permute internal lines and vertices; with external lines fixed