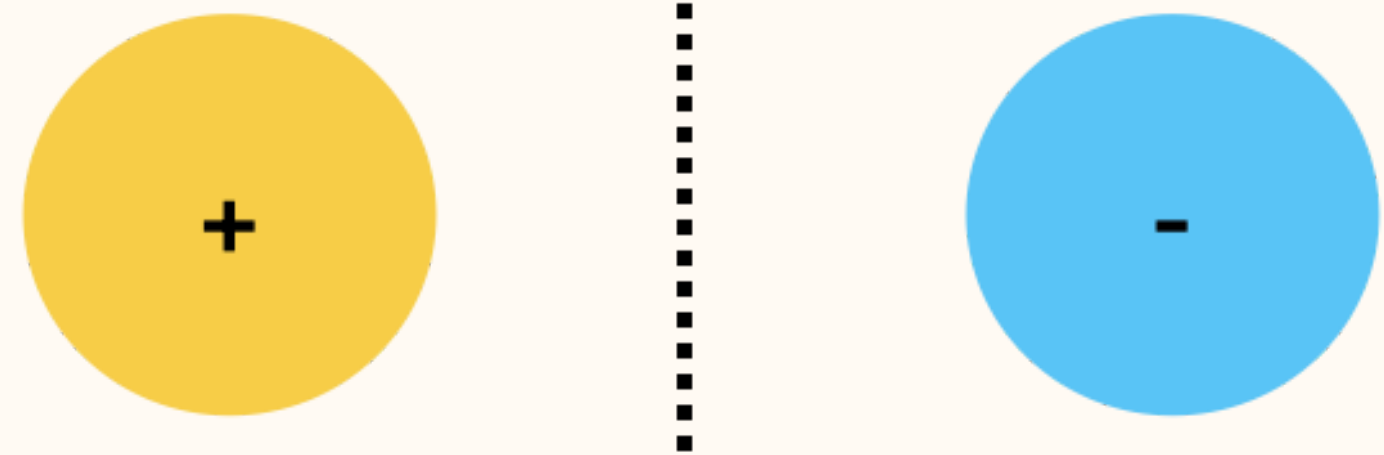
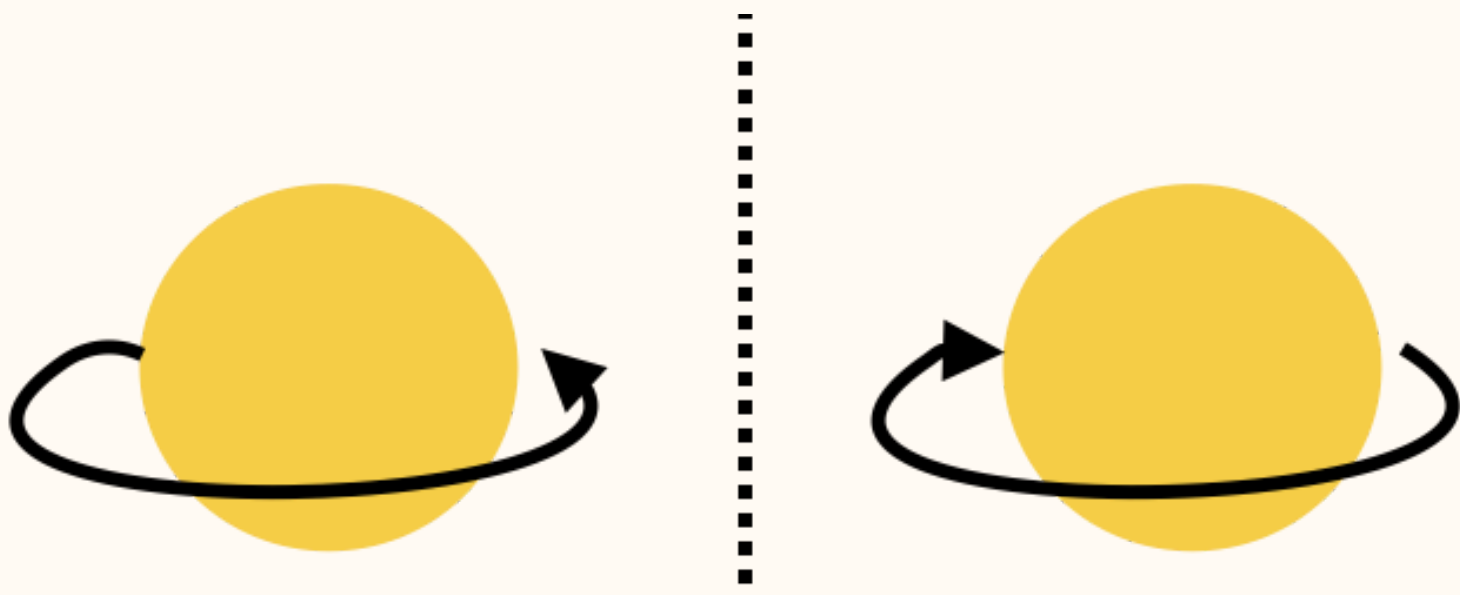


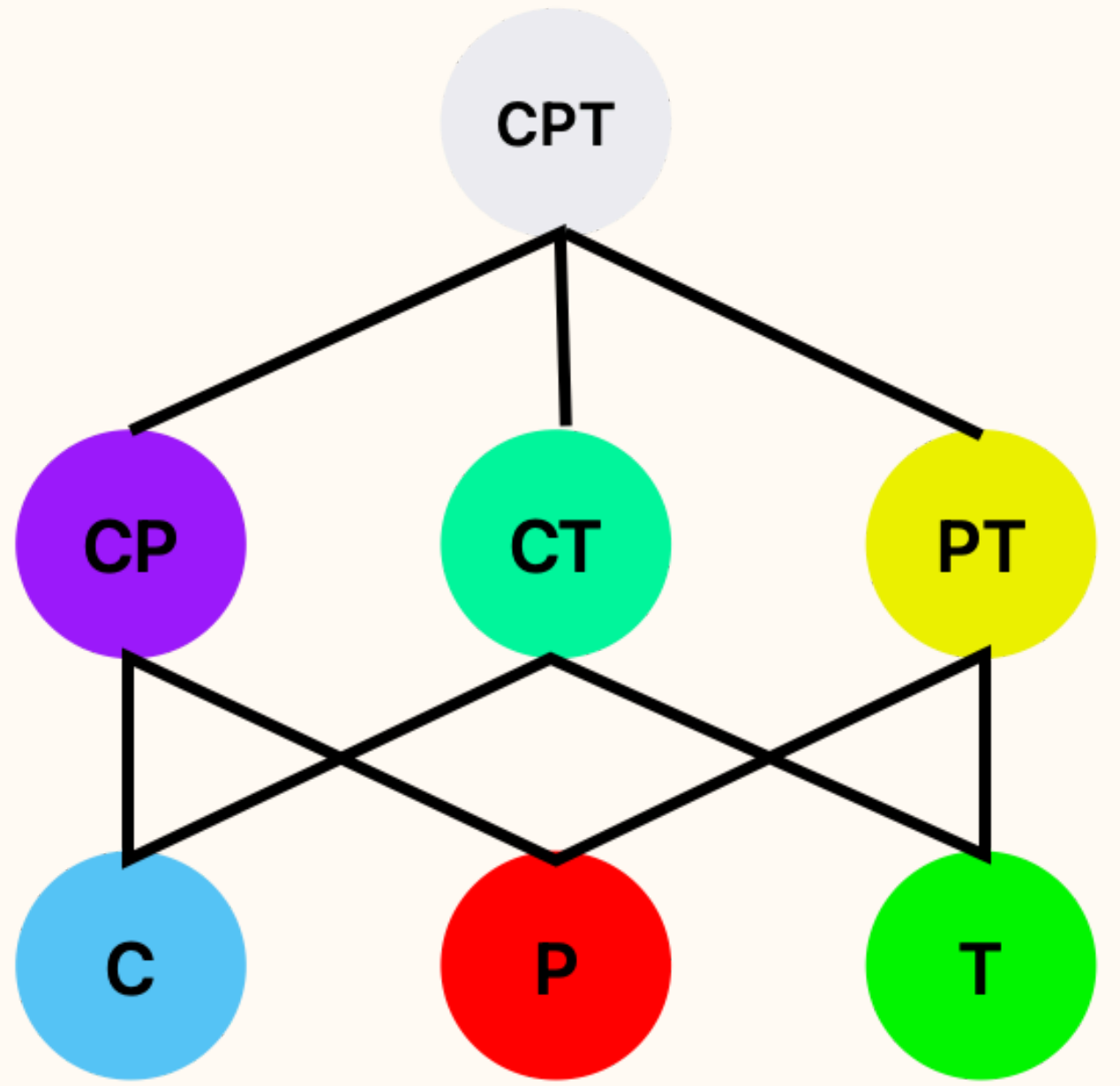
Symmetries



Charge Symmetry



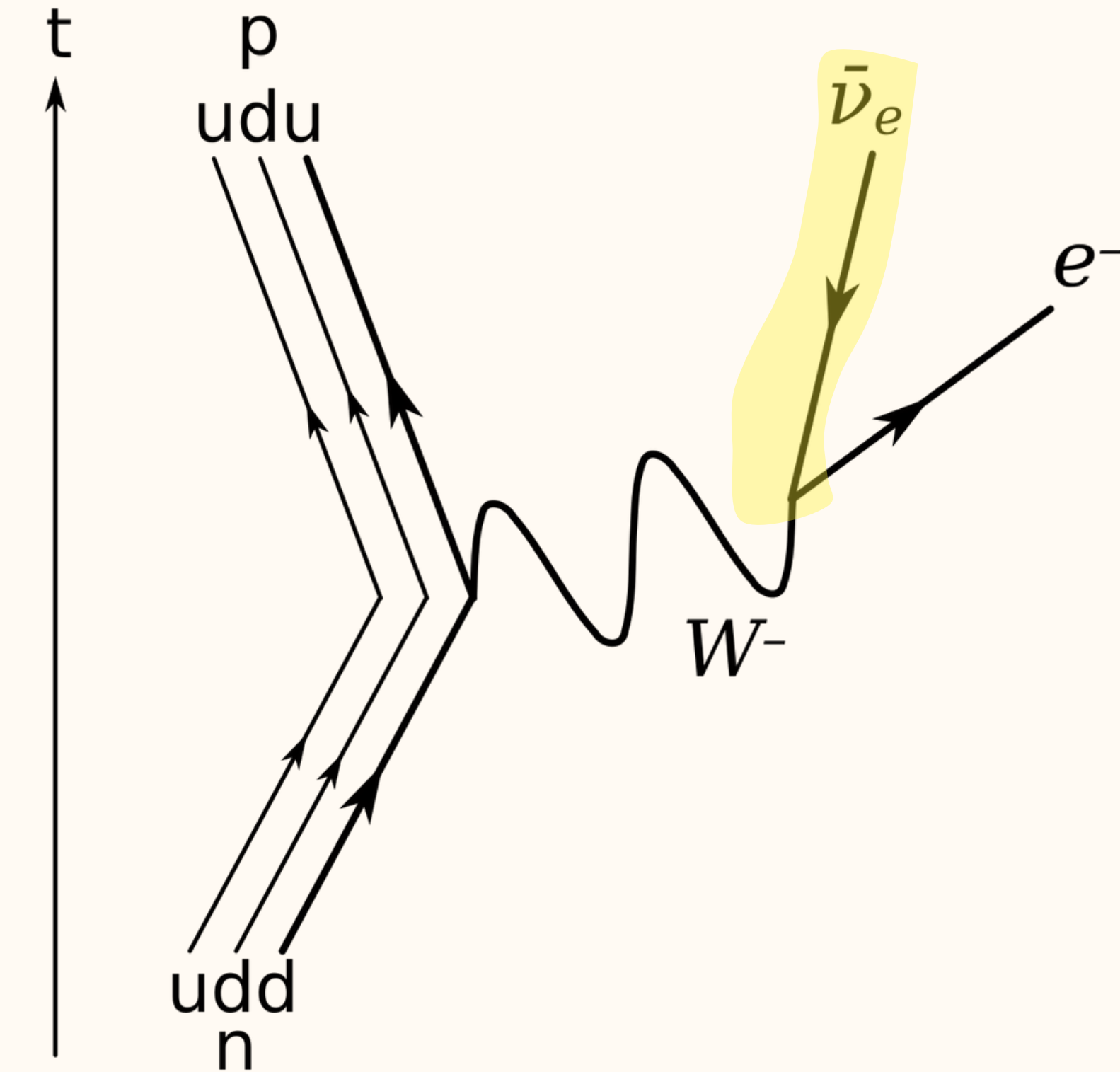
Parity Symmetry



Discrete symmetries combination

Anti-Particles

2



Beta negative decay of a neutron into a proton

Anti-Neutrino can be seen as :
Neutrino going backward in time
(T-symmetry).

Equivalent to :
Neutrino that underwent CP
operation .

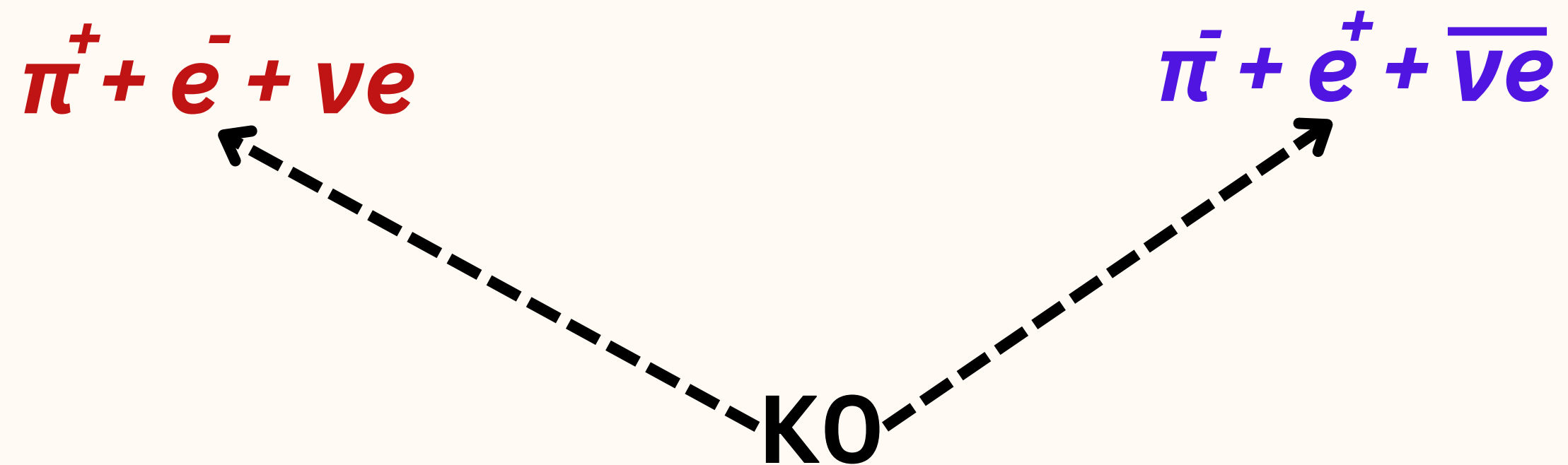


Blurb !

Are you made of Matter
or Anti-Matter?

Force	C	P	CP
Gravity	✓	✓	✓
Electromagnetism	✓	✓	✓
Strong interaction	✓	✓	✓
Weak interaction	✗	✗	✗

CPV in Kaon mixing



Neutral Kaon is “it’s own anti-particle”

$$\delta_L = \frac{BR(e^+\pi^-) - BR(e^-\pi^+)}{BR(e^+\pi^-) + BR(e^-\pi^+)}$$

$$\delta_L = 3322 \pm 58 \text{ (stat)} \pm 47 \text{ (syst)} \text{ ppm}$$

$$= 3322 \pm 74 \text{ (combined)} \text{ ppm.}$$

Meaning : The **blue mode** ($\pi^- + e^+$) happens slightly more often than the other

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