Particle Interactions

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Examples

1. Which of the following are possible?

   (a)

	n	$\longrightarrow$	p	+	e^-	+	$\bar{\nu}_e$
Q	0	$\rightarrow$	+1		-1		0
B	+1	$\rightarrow$	+1		0		0
L	0	$\rightarrow$	0		+1		-1
S	0	$\rightarrow$	0		0		0

   All of the quantities are conserved, so this β decay is possible.

   (b)

	Λ^0	$\longrightarrow$	p	+	π^-
Q	0	$\rightarrow$	+1		-1
B	+1	$\rightarrow$	+1		0
L	0	$\rightarrow$	0		0
S	-1	$\rightarrow$	0		0

   Q, B and L are conserved, and the strangeness changes by +1 in this weak decay.

2. Identify particle X:

	p	+	π^-	$\longrightarrow$	n	+	π^0	+	π_-	+	X
Q	+1		-1	$\rightarrow$	0		0		-1		+1
B	+1		0	$\rightarrow$	+1		0		0		0
L	0		0	$\rightarrow$	0		0		0		0
S	0		0	$\rightarrow$	0		0		0		0

   From its properties, the particle X must be a π^+.