1-1

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> 写出三代轻子及其反粒子的符号、质量、电荷、自旋、各代轻子量子数。

Lepton name	Symbol	M	Q	J	L_e	L_μ	L_τ
Electron	e^-	0.511	-1	$1/2$	$+1$	0	0
anti-Electron	e^+	0.511	$+1$	$1/2$	-1	0	0
Electron neutrino	ν_e	$< 2 \times 10^{-6}$	0	$1/2$	$+1$	0	0
anti-Electron neutrino	$\tilde{\nu}_e$	$< 2 \times 10^{-6}$	0	$1/2$	-1	0	0
muon	μ^-	105.66	-1	$1/2$	0	$+1$	0
anti-muon	μ^+	105.66	$+1$	$1/2$	0	-1	0
muon neutrino	ν_μ	$< 2 \times 10^{-6}$	0	$1/2$	0	$+1$	0
anti muon neutrino	$\tilde{\nu}_\mu$	$< 2 \times 10^{-6}$	0	$1/2$	0	-1	0
tau	τ^-	1776.86	-1	$1/2$	0	0	$+1$
anti-tau	τ^+	1776.86	$+1$	$1/2$	0	0	-1
tau neutrino	ν_τ	$< 2 \times 10^{-6}$	0	$1/2$	0	0	$+1$
anti tau neutrino	$\tilde{\nu}_\tau$	$< 2 \times 10^{-6}$	0	$1/2$	0	0	-1

1-1-2

> 写出三代夸克及其反粒子的符号、质量、电荷、自旋、重子数、同位旋第三分量、粲荷、奇异荷、底荷和顶荷；验证推广的 Gell-Mann-Nishijima 公式 $Q = I_z + \dfrac{\mathcal{B} + S + C + B + T}{2}$ 。

Quark flavour	M MeV	Q	J	B	I_3	c	s	t	b
$u, \tilde{u}$	2.4	$+2/3$	$1/2$	$1/3$	$+1/2$	0	0	0	0
$d, \tilde{d}$	4.8	$-1/3$	$1/2$	$1/3$	$-1/2$	0	0	0	0

Quark flavour	M MeV	Q	J	B	I_3	c	s	t	b
$c, \tilde{c}$	1275	$+2/3$	$1/2$	$1/3$	0	$+1$	0	0	0
$s, \tilde{s}$	96	$-1/3$	$1/2$	$1/3$	0	0	-1	0	0
$t, \tilde{t}$	172440	$+2/3$	$1/2$	$1/3$	0	0	0	$+1$	0
$b, \tilde{b}$	4180	$-1/3$	$1/2$	$1/3$	0	0	0	0	-1

对于 $u, \tilde{u},\ 2/3 = 1/2 + (1/3)\,/2;$

对于 $d, \tilde{d},\ -1/3 = -1/2 + (1/3)\,/2;$

对于 $c, \tilde{c},\ 2/3 = 0 + (1/3 + 1)\,/2;$

对于 $s, \tilde{s},\ -1/3 = 0 + (1/3 - 1)\,/2;$

对于 $t, \tilde{t},\ 2/3 = 0 + (1/3 + 1)\,/2;$

对于 $b, \tilde{b},\ -1/3 = 0 + (1/3 - 1)\,/2$。

于是推广的 Gell-Mann-Nishijima 公式成立。