

side \mathfrak{su}_4 are not equivalent, if one consider the charge w
of $a_1 + a_1 + T_1$ into a_3 is not symmetric under the excha
ange $a \leftrightarrow b$ is equivalent to flipping the weight associat
nching of the 248 of $e_{8(-24)}$ goes as follows,

$$\begin{aligned}
& : 248 = (24, 1) \oplus (1, 24) \oplus (10, 5) \oplus (\overline{10}, \overline{5}) \oplus (5, \overline{10}) \\
& = (24, 1)_0 \oplus (1, 15)_0 \oplus (1, \overline{4})_5 \oplus (1, 4)_{-5} \oplus (1, 1)_0 \\
& \quad \oplus (10, 4)_{-1} \oplus (10, 1)_4 \oplus (\overline{10}, \overline{4})_1 \oplus (\overline{10}, 1)_{-4} \\
& \quad \oplus (5, 6)_2 \oplus (5, \overline{4})_{-3} \oplus (\overline{5}, 6)_{-2} \oplus (\overline{5}, 4)_3 \\
& = (24, 1, 1)_{0,0} \oplus (1, 3, 1)_{0,0} \oplus (1, 1, 3)_{0,0} \oplus (1, 2, 2)_{0,2} \oplus \\
& \quad \oplus (1, 1, 1)_{0,0} \oplus (1, 2, 1)_{5,-1} \oplus (1, 1, 2)_{5,1} \oplus (1, 2, 1)_{-5,-1} \\
& \quad \oplus (1, 1, 1)_{0,0} \oplus (10, 2, 1)_{-1,1} \oplus (10, 1, 2)_{-1,-1} \oplus (10, 1, 1)_{-4,0} \\
& \quad \oplus (\overline{10}, 2, 1)_{1,-1} \oplus (\overline{10}, 1, 2)_{1,1} \oplus (\overline{10}, 1, 1)_{-4,0} \\
& \quad \oplus (5, 2, 2)_{2,0} \oplus (5, 1, 1)_{2,2} \oplus (5, 1, 1)_{2,-2} \oplus (5, 2, 1)_{-3,-1} \\
& \quad \oplus (\overline{5}, 2, 2)_{-2,0} \oplus (\overline{5}, 1, 1)_{-2,2} \oplus (\overline{5}, 1, 1)_{-2,-2} \oplus (\overline{5}, 2, 1)_{-3,-1}
\end{aligned}$$

$$\begin{aligned}
& : 248 = (24, 1) \oplus (1, 24) \oplus (5, 10) \oplus (\overline{5}, \overline{10}) \oplus (\overline{10}, 5) \\
& = (24, 1)_0 \oplus (1, 15)_0 \oplus (1, \overline{4})_5 \oplus (1, 4)_{-5} \oplus (1, 1)_0 \\
& \quad \oplus (10, \overline{4})_1 \oplus (10, 1)_{-4} \oplus (\overline{10}, \overline{4})_{-1} \oplus (\overline{10}, 1)_4 \\
& \quad \oplus (5, 6)_{-2} \oplus (5, 4)_3 \oplus (\overline{5}, 6)_2 \oplus (\overline{5}, \overline{4})_{-3} \\
& = (24, 1, 1)_{0,0} \oplus (1, 3, 1)_{0,0} \oplus (1, 1, 3)_{0,0} \oplus (1, 2, 2)_{0,2} \oplus \\
& \quad \oplus (1, 1, 1)_{0,0} \oplus (1, 2, 1)_{5,-1} \oplus (1, 1, 2)_{5,1} \oplus (1, 2, 1)_{-5,-1} \\
& \quad \oplus (1, 1, 1)_{0,0} \oplus (10, 2, 1)_{1,-1} \oplus (10, 1, 2)_{1,1} \oplus (10, 1, 1)_{-4,0} \\
& \quad \oplus (\overline{10}, 2, 1)_{-1,1} \oplus (\overline{10}, 1, 2)_{-1,-1} \oplus (\overline{10}, 1, 1)_{4,0} \\
& \quad \oplus (\overline{5}, 2, 2)_{2,0} \oplus (\overline{5}, 1, 1)_{2,2} \oplus (\overline{5}, 1, 1)_{2,-2} \oplus (\overline{5}, 2, 1)_{-3,-1} \\
& \quad \oplus (5, 2, 2)_{-2,0} \oplus (5, 1, 1)_{-2,2} \oplus (5, 1, 1)_{-2,-2} \oplus (5, 2, 1)_{-3,-1}
\end{aligned}$$

$$: 248 = (24, 1) \oplus (1, 24) \oplus (5, 10) \oplus (\overline{5}, \overline{10}) \oplus (\overline{10}, 5)$$

1
00:00:04,430 --> 00:00:02,030
a recently published paper by David

2
00:00:06,050 --> 00:00:04,440
Chester Michael Rios and Alicia marení

3
00:00:08,450 --> 00:00:06,060
classified ways to recover the standard

4
00:00:10,310 --> 00:00:08,460
model and gravity from a real form E8

5
00:00:12,169 --> 00:00:10,320
their paper discusses the representation

6
00:00:14,030 --> 00:00:12,179
theory for the most common Grand unified

7
00:00:15,709 --> 00:00:14,040
theories combined with conformal gravity

8
00:00:17,450 --> 00:00:15,719
one of the areas that Garrett lisi's

9
00:00:19,130 --> 00:00:17,460
previous work was seen as problematic

10
00:00:20,769 --> 00:00:19,140
was that matter particles such as the

11
00:00:23,689 --> 00:00:20,779
electron and quarks typically require

12
00:00:26,210 --> 00:00:23,699
192 degrees of freedom while E8 can only

13
00:00:28,250 --> 00:00:26,220

work with 128. this paper provides a

14

00:00:30,109 --> 00:00:28,260

chiral matter lagrangian that uses extra

15

00:00:32,450 --> 00:00:30,119

time Dimensions to efficiently encode

16

00:00:34,010 --> 00:00:32,460

Mass flavor oscillations with 128

17

00:00:35,870 --> 00:00:34,020

degrees of freedom which is related to

18

00:00:37,250 --> 00:00:35,880

the so-called split octo-octonionic

19

00:00:38,870 --> 00:00:37,260

projective plane the mathematics

20

00:00:40,430 --> 00:00:38,880

Explorer provides the foundation for a

21

00:00:44,810 --> 00:00:40,440

new class of physical models one model

22

00:00:47,030 --> 00:00:44,820

isolates su-32 cross su5 inside E8 -24

23

00:00:49,010 --> 00:00:47,040

which includes su5 gut for the standard

24

00:00:51,529 --> 00:00:49,020

model with a new gravitational symmetry

25

00:00:53,990 --> 00:00:51,539

this allows for a single 248 dimensional

26

00:00:56,150 --> 00:00:54,000

representation of E8 to minimally extend

27

00:00:57,950 --> 00:00:56,160

a conformal grand unified theory with a

28

00:00:59,510 --> 00:00:57,960

new gravitational Higgs sector which may