AdS_3 Solutions w/ exceptional symmetry

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1) Motivation / Intro
2) $\mathcal{M}_7$ as S^6 over I
3) Solutions preserving $\mathcal{N} = 7$ & 8
4) $F(4)$ sol. : the brane picture
5) Curved DW's w/in $ISO(7)$ 4D sugra

1) AdS/CFT $\rightarrow$ "the more the better"

$\hookrightarrow$ $CFT_2 \rightarrow \infty$-dim. conf. alg. $\rightarrow AdS_3 \rightarrow$ HARD!

→ Too much freedom! $\mathcal{M}_7 \to$ Analytic sol. $F(4)$, $G(3)$

$c_{hol} = \infty$ (noncompact !) $AdS_6 \times S^3$

2) $F(4) \supset SL(2,\mathbb{R}) \times SO(7)$

$G(3) \supset \underbrace{SL(2,\mathbb{R})}_{\frac{1}{2} ISO(AdS_3)} \times G_2 \to$ R-symm. $\longrightarrow ISO(\mathcal{M}_7)$. R-symm.

- $SO(7)$ $\mathcal{M}_7$ $\frac{G}{H}$, $G \to SO(7)$, s.t. $\dim(G/H) \overset{!}{\leq} 7$
  - $H = G_2 \to \cancel{\mathcal{M}_7 = S^7}$
  - $H = SO(6)$ $\mathcal{M}_7$ is S^6 over I → NK
- $G_2 \to G_2/SU(3) \simeq S^6$

Ansatz $ds^2_{10} = e^{2A} ds^2_{AdS_3} + e^{2Z} dz^2 + e^{2Q} d\Omega^2_{(6)}$

$$\boxed{\begin{aligned} dJ &= 3\Omega_R \\ d\Omega_I &= -2J^2 \\ d\Omega_R &= 0 \end{aligned}}$$

$J \wedge \Omega = 0$

$i\Omega \wedge \bar{\Omega} = \frac{4}{3} J^3$

$$H_{(3)} = \underbrace{h_0}_{0\ (\mathrm{SUSY})} \mathrm{vol}_{(AdS_3)} + h_1 \Omega_R + \underbrace{h_2}_{0\ (\mathrm{BI})} \Omega_I + h_3\, dz \wedge J \;\longrightarrow\; h_3 \sim h_1' \;\longrightarrow\; H_{(3)} = d(\beta J)$$

$$e^{-B\wedge} F = \underset{\substack{\downarrow \\ \mathrm{const}}}{F_{(0)}} + d(\varphi \Omega_I) + f_4\, dz \wedge \Omega_R + \kappa J^3$$

$\underline{\underline{SO(7)}}$: $f_4 = \varphi = \beta = 0$

SUSY sol.

- $\mathcal{N} = 8$ $F(4)$ (analytic, UNIQUE)
- $\mathcal{N} = 7$ $G(3)$ (" , ") ← !
- $\mathcal{N} = 1$ G_2 flavor (non-unique, num.) → pick BC's

$F(4)$

$$ds^2_{10} = \frac{4}{9}\left(\frac{q}{p}\right)^{1/3}\left(\frac{1+z^3}{\sqrt{z}}\, ds^2_{AdS_3} + \frac{9}{4}\frac{\sqrt{z}}{1+z^3}\, dz^2 + \frac{9}{4}\frac{1}{\sqrt{z}}\, d\Omega^2_{(6)}\right), \quad e^{\Phi} = q^{-1/6} p^{-5/6} z^{-5/4}$$

$$H_{(3)} = 0, \quad e^{-B\wedge} F = p - \frac{5}{6} q J^3$$

G(3) $\rightarrow f_4 = 0$, Num. $\mathcal{N}=1 \rightarrow$ O2 - O2 , O8 - O2 , ...

ISO(7)

mIIA on S^6

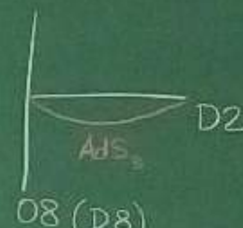
SO(7) $\rightarrow \mathcal{N}=0$ AdS_4

$\mathcal{N}=8/2$ DW_3

D2 : 0 1 ______ 9

D8/O8 : 0 1 2 3 4 5 6 7 8 ↑ y $\longrightarrow \frac{1}{4}$ - BPS

[Imamura, '02]



$$C_{(3)} = \frac{H_{O8}}{H_{D2}}\, dx^{019}$$

$$H_{D2} = 1 + \frac{q}{r^5} \,, \quad H_{O8} = 1 + p\, y$$

$$r \equiv q^{1/3}\left(\frac{\rho}{c}\right)^{2/3} , \quad y \equiv p^{-1/3}\left(\frac{s}{\rho}\right)^{2/3}$$

$$(r, y) \rightarrow (\rho, \alpha)$$

$$ds^2_{10} \overset{\rho\to 0}{\sim} \frac{4}{9}\left(\frac{q}{p}\right)^{1/3} s^{-1/3} c^{-5/3} \left(ds^2_{AdS_3} + d\alpha^2 + \frac{9}{4} c^2 d\Omega^2_{(6)} \right)$$

$$c_{hol} = \int_{\mathcal{M}_7} e^{2A-\Phi}\, vol_{(\mathcal{M}_7)} = 2\, p^{1/3} q^{5/3} \int_0^{+\infty} z\, dz$$