Twisted Branes and Non-local Stabilizations

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Abstract:

Brane Stabilizations in D>4 are done using specific Capture Mechanisms (H) as shown in previous Fate papers. These yield non-local results on the fiber bundles around the p-branes (or any brane) and local on the brane.

Localities and Tail Spaces

A stabilization in locality M is

$$stab(x) = \{g \in G | gx = x\}\ x \in X$$

G being a **Lie Group**

X and M are parallel localities with M not being a Group.

The Group Action is thus

$$\left|\phi^F : G \longrightarrow \frac{G}{X}\right|^{D>4}$$

ϕF determining a String as a Fiber Field as done in Fate

For the Stabilization (H), a local action emerges

$$(H : M \longrightarrow M) - \left|\sum_{r=0}^{\infty} \phi^F\right|_M$$

$$(f : E \longrightarrow B) - \left|\sum_{r=0}^{\infty} \phi^F\right|_M$$

The above map f: E to B defines a fiber Bundle with base space B and Total Space E.

Therefore, the map $H \longrightarrow f$ is non local and so

$$stab(f) = \{H, f \in E | gx \neq x, g \neq e\} \quad g \in G$$

which is a Free Action under Lie Group G. and thus the stabilization is also non-local

Also, $orb(f) = \{gx \neq x, g \neq e | H, f \in E\}$ i.e. fiber trajectories are always non-local.

It is now shown that the fiber action (F_σ) on the brane is zero.

$$G: \Omega(H) \longrightarrow M = 0 \quad \Rightarrow F_\sigma = 0$$

i.e. fibers are not present in locality M though

$\Omega(f) \longrightarrow M \neq 0$ And $(H) \longrightarrow M = M$ $since$ $H: M \longrightarrow M$ is local.

The maps for G, F and H are collected

$F_\sigma^{(H)}{}^{G} = \sum_{r=0}^{\infty} {}_{D>4}^{ib}C$ which is called a **Tail Space** in the Gauge field

For every point in the Tail Space, the maps G, F and H have to be followed.

A sum of the Capture Mechanisms beautifully yield an E8 Symmetry

$$\begin{aligned}\underset{\sim}{A} &= (H_1 + H_2) + \Psi \\ &= \left[\left(\frac{1}{2}\underset{\sim}{\omega} + \frac{1}{4}\mathrm{e}\phi + \frac{1}{2}\underset{\sim}{\omega} + \frac{1}{4}\mathrm{e}\phi + \underset{\sim}{\mathrm{w}} + \mathrm{B}_1 + \mathrm{B}_1\right)\right. \\ &+ \left(\underset{\sim}{g} + \underset{\sim}{B_2} + \underset{\sim}{\mathrm{w}} + \underset{\sim}{\mathrm{x}}\,\phi\right) + \left(\mathrm{v_e} + \underset{\sim}{\mathrm{e}} + \mathrm{u} + \mathrm{d}\right) \\ &\left. + \left(\mathrm{v}_\mu + \mu + \mathrm{c} + \mathrm{s}\right) + \left(\mathrm{v}_\tau + \tau + \mathrm{t} + \mathrm{b}\right)\right] \\ &= (\mathrm{X} + \mathrm{X}_2) + (\mathrm{X}_3 + \mathrm{X}_4 + \mathrm{X}_5)\end{aligned}$$

$$X_{3,4,5} = (k_\alpha + \alpha) + (\beta + \gamma)$$

This shows the symmetry in the field groups (i.e. 3rd, 4th and 5th brackets)

Here, ω is the spin connection,

e is the gravitational frame variable,

ϕ is the Higgs boson,

w is the Weak Gauge field,

B1 is the right partner to the weak gauge field,

g is the strong gauge field

and B2 is the baryon-lepton number gauge fields

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Credits:
Mark Aaron Simpson, Charles.A. Laster, Bob Turner, Ruby Mae Kiraly and all members of string Theory development group on facebook

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