

Brane Physics from Warped Gravity Solutions

Christian Ferko, UChicago

- Zero modes of type IIB on Taub-NUT give 5 free scalars and one self-dual tensor

$$\delta F_5 = h_3(x) \wedge \underbrace{\omega_2}_{\text{Taub-NUT 2-form}} \implies \star h_3 = h_3.$$

- Can we see interacting equation of motion too?

Duality Chain



IIB background with F_5 flux:

$$\begin{aligned}
 ds^2 = & f(y) dx_{023}^2 + f(y) \left(1 + \frac{1}{y}\right) (dy^2 + y^2 d\Omega_2^2) \\
 & + f(y)^{-1} dx_{456}^2 + f(y)^{-1} \left(1 + \frac{1}{y}\right)^{-1} (d\chi + \cos(\alpha) \cos(\theta) d\psi)^2,
 \end{aligned}$$

$$F_5 = h_e dx^{023} \wedge \omega_2^{(e)} + h_m dx^{456} \wedge \omega_2^{(m)}.$$

Flux Zero Mode \longleftrightarrow Interactions

- Carrying the δF_5 zero mode through the chain gives

$$\begin{aligned}\delta g_{24} &= -\epsilon_e f(y), \\ \delta F_5 &= \epsilon_e dx^{043} \wedge \omega_2^{(e)} + \epsilon_m dx^{256} \wedge \omega_2^{(m)}.\end{aligned}$$

- The requirement $\star F_5 = -F_5$ constrains

$$\epsilon_m = -\epsilon_e \sqrt{1 + h_m^2}.$$

- Matches non-linear self-duality for the tensor, to leading order in ϵ_e and ϵ_m .