

ERRATUM

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On the Positivity of Matter Energy

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On page 40, Eq. (26) should read

$$B_r \approx 3.5,$$

On page 44, Eq. (48) should read

$$\rho_{\mathcal{R}^2} = 24B (\ddot{\alpha}^2 - 2\dot{\alpha}\ddot{\alpha} - 6\dot{\alpha}^2\ddot{\alpha})$$

On page 44, Eq. (49) should read

$$p_{\mathcal{R}^2} = 8B (9\ddot{\alpha}^2 + 12\dot{\alpha}\ddot{\alpha} + 18\dot{\alpha}^2\ddot{\alpha} + 2\ddot{\alpha}^3).$$

On page 45, Eq. (54) should read

$$\kappa^2 = \kappa_0^2 \left[1 - \frac{15\zeta(3)\overline{\chi}}{16\lambda B_r^3} - \frac{g_s^2 \overline{\chi}}{384\pi^2} \right]^{-1}.$$

On page 46, the paragraph in lines 7–19 should read:

The only known, three-generation Calabi–Yau manifold [27] is characterised by $\overline{\chi} = \pm 6$ (taking into account the mirror manifold), so that these corrections are proportionately

$$\left. \frac{\delta\kappa^2}{\kappa^2} \right|_{\text{tree-level}} \approx \pm \frac{6.76}{\lambda B_r^3}, \quad \left. \frac{\delta\kappa^2}{\kappa^2} \right|_{\text{1-loop}} \approx \pm 8 \times 10^{-4}, \quad (56)$$

in the first of which we have to substitute the result (26) for B_r , and which now depends upon the compactification volume. The simplest approximation [22] in reducing the ten-action to the standard four-dimensional supergravity form is the six-torus, for which $\overline{V}_6 = 64\pi^6 \alpha'^3$, so that $\lambda = 60\pi^3$, in

which case the tree-level and one-loop corrections to κ_0^2 are approximately

$$\left. \frac{\delta\kappa^2}{\kappa^2} \right|_{\text{tree-level}} \approx \pm 1.35 \times 10^{-4} \left(\frac{3}{B_r} \right)^3, \quad \left. \frac{\delta\kappa^2}{\kappa^2} \right|_{\text{1-loop}} \approx \pm 7.92 \times 10^{-4} \left(\frac{2}{A_r} \right), \quad (57)$$

both being of the same sign as that of $\bar{\chi}$ and of the same order of magnitude. Thus, the sign of κ_0^2 remains unchanged by the renormalisation, as it should, since the positivity of the gravitational constant is linked to the Lorentzian signature of space-time [39], and hence to the positivity of matter energy in the Universe.

The following references should read:

- [15] M.D. Pollock, *Int. J. Mod. Phys. A* **7**, 4149 (1992); *Erratum ibid.* **27**, 1292005 (2012); *Int. J. Mod. Phys. D* **3**, 569 (1994).
- [20] M.D. Pollock, *Phys. Lett. B* **411**, 68 (1997); *Corrigendum ibid.* **743**, 542 (2015).
- [21] M.D. Pollock, *Int J. Mod. Phys. A* **16**, 3217 (2001); *Erratum ibid.* **27**, 1292008 (2012); *Erratum ibid.* **31**, 1692001 (2016).
- [25] M.D. Pollock, *Int. J. Mod. Phys. D* **11**, 1409 (2002); *Int J. Mod. Phys. A* **21**, 373 (2006); *Erratum ibid.* **28**, 1392001 (2013).
- [29] M.D. Pollock, *Int. J. Mod. Phys. D* **4**, 305 (1995); *Erratum ibid.* **21**, 1292002 (2012).
- [31] M.D. Pollock, *Phys. Lett. B* **448**, 13 (1999); *Corrigendum ibid.* **753**, 687 (2016); *Corrigendum ibid.* **775**, 366 (2017).
- [39] M.D. Pollock, *Phys. Lett. B* **495**, 401 (2000); *Corrigendum ibid.* **750**, 667 (2015).