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Supergravity Spectra in Type IIB Flux Compactifications

Tuesday 5 July 2016 14:00 (20 minutes)

I will present results from work done with David Marsh (DAMTP, Cambridge) on the spectra of type IIB flux compactifications at large complex structure, as reported in our paper in JHEP (arXiv:1509.06761). In this work we considered four-dimensional effective supergravities arising in the low-energy limit of flux compactifications of type IIB string theory, and we computed the spectra of the Hessian matrix and the matrix that governs the critical point equation, at large complex structure. We found both spectra analytically in a subspace of the moduli space, independently of many details of the compactification. The resulting eigenvalue distributions are remarkably given by highly degenerate eigenvalues at integer multiples of the value of the superpotential and the gravitino mass. In this subspace, while the spectrum of the Hessian matrix contains no tachyons, there are also no critical points. Our results imply that proposed random matrix theory models are inapplicable at large complex structure, and we argue that for more general compactifications, existing 'universality theorems'in the random matrix theory literature may not apply. In this poster, after outlining the context, I will present the key results of this work. I will also include a discussion contrasting our results with the expectations from the much-used continuous flux approximation, and outlining the implications for the applicability of random matrix theory to the statistical modelling of the string theory landscape.

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