



Equivalence of A-Maximization and Volume Minimization

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The low energy effective theory on a stack of D3-branes at a Calabi-Yau singularity is an $\mathcal{N} = 1$ quiver gauge theory. The AdS/CFT correspondence predicts that the strong coupling dynamics of the gauge theory is described by weakly coupled type IIB supergravity on $AdS_5 \times L^5$, where L^5 is a Sasaki-Einstein manifold. Recent results on Calabi-Yau algebras efficiently determine the Hilbert series of any superconformal quiver gauge theory. We use the Hilbert series to determine the volume of the horizon manifold in terms of the fields of the quiver gauge theory. One corollary of the AdS/CFT conjecture is that the volume of the horizon manifold L^5 is inversely proportional to the a-central charge of the gauge theory. By direct comparison of the volume determined from the Hilbert series and the a-central charge, this prediction is proved independently of the AdS/CFT conjecture.

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