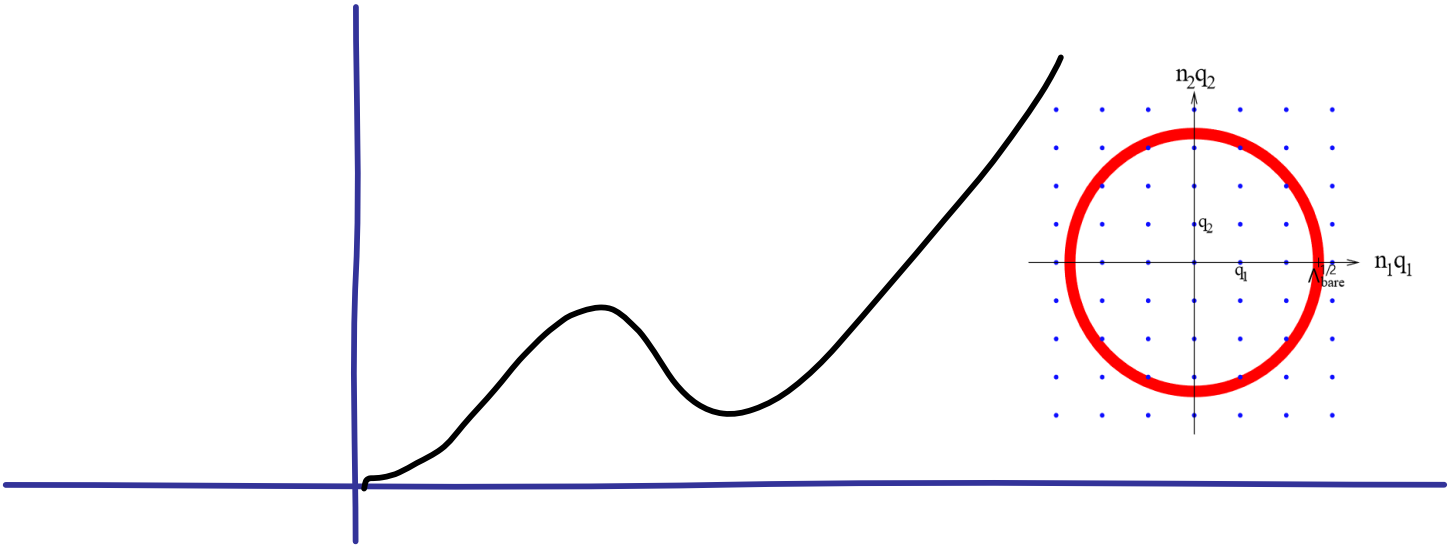
Joe's positive energy in research and riding



Joe's influence on (my) research

TASI '92...Strings '95...

...exact RG, Fermi surface EFT, D-branes, ...

5 wonderful collaborations plus ~20 years of wide ranging discussions, trading drafts etc.

Information | References (2) | Citations (270) | Files | Plots

Don't panic! Closed string tachyons in ALE space-times

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JHEP 0110 (2001) 029
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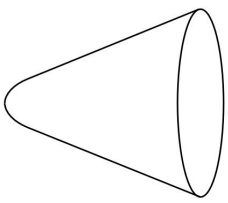
SLAC-PUB-8955, NSF-ITP-01-75
e-Print: hep-th/0108075 | PDF

Abstract
We consider closed string tachyons localized at the fixed points of noncompact nonsupersymmetric orbifolds. We argue that tachyon condensation drives these orbifolds to flat space or supersymmetric ALE spaces. The decay proceeds via an expanding shell of dilaton gradients and curvature which interpolates between two regions of distinct angular geometry. The string coupling remains weak throughout. For small tachyon VEVs, evidence comes from quiver theories on D-branes probes, in which deformations by twisted couplings smoothly connect non-supersymmetric orbifolds to supersymmetric orbifolds of reduced order. For large tachyon VEVs, evidence comes from worldsheet RG flow and spacetime gravity. For $\IC^2/\IZ_n$, we exhibit infinite sequences of transitions producing SUSY ALE spaces via twisted closed string condensation from non-supersymmetric ALE spaces. In a T-dual description this provides a mechanism for creating NS5-branes via {\it closed} string tachyon condensation similar to the creation of D-branes via {\it open} string tachyon condensation. We also apply our results to recent duality conjectures involving fluxbranes and the type 0 string.

Keyword(s): INSPIRE: tachyon: condensation | string: closed | orbifold: fixed point | orbifold: deformation | space: ALE | duality | sigma model: linear | renormalization group | field theory: conformal | space-time: anti-de Sitter

Record added 2001-08-13, last modified 2017-03-23



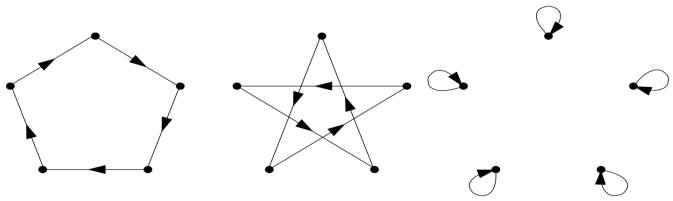


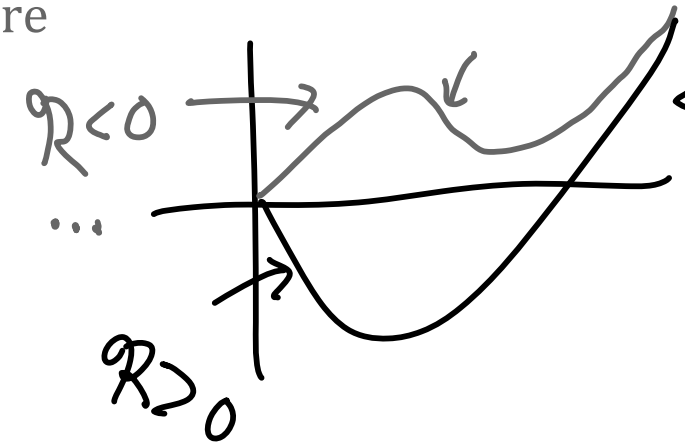
Figure 2: Quiver diagrams for the $\mathbb{C}/\mathbb{Z}_5$ orbifold: for Z, for ξ, and for A_μ and X^m.

Figure 3: $\mathbb{C}/\mathbb{Z}_n$ singularity with a twisted tachyon VEV, as seen by a D-brane probe.

Incredible combination of technical power, conceptual depth, and agility

D-10 de A-P-S
anti D3 brane P
negative curvature

Orientifolds P
Quantum effects Giddings-Kachru-



Flux quanta
Bousso-P

1/Volume coupling

...

Most energy sources introduced/developed by Joe! D-brane, O-planes, RR fluxes, warped models, and:

HETEROTIC STRINGS WITH TREE LEVEL COSMOLOGICAL CONSTANT

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Received 14 November 1988

We discuss heterotic (and super) string compactification with tree level cosmological constant. The question of having a small supersymmetry breaking is also addressed.

One of the striking features of string theory is the vanishing of the tree level cosmological constant. This vanishing has been attributed to a scaling argument [1] and to the divergent Möbius volume [2]. However, these explanations are rather circular, in that they assume consistent string propagation in a static background; they are more in the nature of consis-

Consider a tree-level compactification of the heterotic string. The world-sheet theory is the product of the ghost conformal field theory, a compact conformal field theory, and a non-compact conformal field theory, with total central charges $(c, \tilde{c}) = (0, 0)$. The ghosts contribute central charges $(-15, -26)$ and the central charges of the compact theory will be de-

$\Lambda > 0$: (1) practical and
(2) conceptual problem in string theory

(1):
Old question: are there any string vacua like ours –

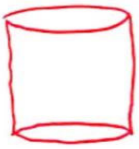
- 3+1 dimensional
- no unbroken supersymmetry
- stable (or long-lived)
- no Brans-Dicke-like scalars (moduli)
- ~~zero cosmological constant~~
  small positive cosmological constant

??

Holographic principle –

What is the central defining principle of string theory, analogous to the Equivalence Principle in GR and the Uncertainty Principle in QM?

Holo: Fundamental degrees of freedom are highly nonlocal, live on boundary of any given regime. Has precise realization in anti-de Sitter space:



But for $\Lambda \geq 0$ we don't know!

Answer: very likely (Silverstein)

But if there is one there are probably many. What chooses – random, anthropic, initial conditions?

$\Lambda = 0$ vs. $\Lambda > 0$

$\Lambda > 0$ vs. quintessence

Joe's slides from 2002 KITP cosmo conference

Hi Eva,

I enjoyed your paper very much, though I am still digesting it. Do I understand your final picture, which is an expanding negatively curved FRW which is preceded by a supercritical theory with increasing dilaton (so that each cuts off the problematic region of the other)? I am confused by the apparent reversal of the RG flow, which seems to be IR toward both the infinite past and the infinite future (though there is nothing impossible about this). Also, do the supercritical dimensions have a particular topology? I wouldn't think that they could be infinite. I guess your example in the appendix answers this.

A few idle thoughts -- one might have thought that it would be useful to study a Riemann surface where one handle degenerates before the others, and so on iteratively, but it sounds like you are saying that this goes somewhere else. Also, you might consider having simultaneously supercritical dimensions times the Riemann surface, so that the latter really undergoes an RG flow in one direction (and presumably any UV completion can be elevated to a real solution).

By the way, I don't think intersecting five-branes work, because they can be blown up into finite-sized instantons and then the string would have to end at a nonsingular point. I think the problem is that Tr(F^2)^2 is nonzero integrated over an R^8, not an S^8.

> I'm a little more
> cynical than you about citations,

You're certainly correct, citation counting is antithetical to really creative work. Unfortunately I have an addictive personality, and need the quick fix. I think I'll go write a c=1 paper, to calm my nerves...

Cheers,

Joe

``Cool kids" were working on D=2 or CY, not D >10 and R<0, but Joe quickly got other ideas and addressed them thoughtfully, on their merits.

Joe was never convinced by any proposed BH resolution, but excited by the developments!

and many more inter-related papers and discussions...

Towards strange metallic holography

Sean A. Hartnoll[♯,♮], Joseph Polchinski[♮], Eva Silverstein[♭,†] and David Tong[♭,♮]

7.6 Fermi seasickness

Yes, I think that the latest ... paper actually does argue for a seasickness instability. But it's not quite the same: there is a PS throat at the bottom of a KS throat, and the branes only make it to the top of the PS throat.

I have been a bit annoyed that the anti-anti-D3 folks never give a straight answer to the question about single anti-D3's, most of the very short paper is explaining the obvious, that this is not a problem. It's only on the blogs that this is a controversy, but it's gone on too long.

Best,
Joe

SB century

Big Sur

`... the pain at the end made the achievement all the greater. I'm sorry about the underestimates of distance, have to figure out how mmr was off.'

In cycling (and physics) there's always someone crazier.

The 5/3 Triple Bypass

also Mulholland Challenge; Marin, SB, Sequoia, Solvang, and Ojai Centuries, Alpha ride, time trials,...

Joe claimed not to get endorphins, and wasn't obviously staring at the views. So why all the cycling?...

one answer:

Another explanation: Cycling community is super intense but relentlessly positive, much like someone we knew...