

**Problem Set 0**  
*What do you want to know?*

**Reading:** Horowitz-Polchinski, gr-qc/0602037

**Due:** Friday, September 5, 2008 by 6 PM, in 6-320 or by email to mcgreevy at mit.

1. Please rate your level of intimacy with each of the following according to the following rough system:

- 1 'I've never heard of it.'
- 2 'I ran into it once on the street on a rainy weekend evening in 1992.'
- 3 'I tried it a few times, but it made my neck hurt.'
- 4 'I ate it for breakfast this morning.'
- 5 'I wrote a 900-page book about it.'

It will help to keep in mind that the goal here is not to impress, but to convey what it is you need to learn.

- (a) constraints of conformal invariance on a QFT
  - (b) the worldvolume theory on a stack of D-branes
  - (c) black hole thermodynamics *e.g.* laws of black hole mechanics, the Brown-York stress tensor
  - (d) representations of supersymmetry
  - (e) 't Hooft's double line notation
  - (f) the Schwinger-Keldysh formalism
2. Have you ever seen a derivation of the Hawking effect which didn't rely on free field theory (and didn't go on and on uninformatively about Bogoliubov transformations)?

[OVER PLEASE]

3. Agree or disagree: I believe in the correctness of AdS/CFT for valid scientific reasons and don't want to see more evidence that it is correct.
4. What physics questions (about, say, QCD or condensed matter or something else) would you like to see answered, for example by the techniques we'll discuss in this class?
5. Complete this sentence as many times as is applicable: I would be disappointed if January 2009 arrived and I still didn't know about ...
6. Tell me other things I need to know to make the class better and more useful.
7. Is there a good reason I should not assign an end-of-term presentation/paper?