8.821 String Theory
Fall 2008

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
Department of Physics
String Theory (8.821) – Prof. J. McGreevy – Fall 2008

Some Topic Suggestions

Lists of references below are intended as entry points to the literature, and not as complete citations of all good work on the subject. For each paper you should of course always also read all papers which cite it, as well as all of the papers to which it refers. The order below is not meaningful, though I've tried to group related topics together.

For most of the papers listed below, a relatively complete citation list can be found using Spires: `http://www.slac.stanford.edu/spires/hep/`.

1. holographic RG flows and an 'a-theorem' [d'Hoker- Freedman review, hep-th/0201253, §9-10]

2. string duals of gauge theories with matter in the fundamental [Karch-Katz, hep-th/0205236; Sakai-Sugimoto, hep-th/0412141, hep-th/0507073] and thermal aspects [see refs in review by Erdmenger et al 0711.4467]

3. more systematic understanding of the real-time AdS/CFT prescription [Son et al, hep-th/0205051, hep-th/0212072; Skenderis-van Rees, arXiv:0805.0150; Iqbal-Liu, 0809.3808.]

4. gravity duals of supersymmetric confining gauge theories with chiral symmetry breaking [Klebanov-Strassler, hep-th/0007191; Maldacena-Nunez, hep-th/0008001; Klebanov review, hep-th/0205100]

5. AdS/QCD [Erlich, Katz, Son, Stephanov, hep-ph/0501128; Karch, Katz, Son, Stephanov, hep-ph/0602229]

6. entanglement entropy from the gravity dual [Ryu-Takayanagi, hep-th/0603001, hep-th/0605073 and cita-tions thereof; see in particular Fursaev, hep-th/0606184]

7. 2d strong-coupling transport in a magnetic field [Hartnoll, Kovtun et al, 0704.1160, 0706.3215]; constraints from EM duality in the bulk [Witten, hep-th/0307041, Kovtun et al, hep-th/0701036]

8. holographic models of superfluidity and superconductivity [HHH, 0803.3295, 0810.1563, Kovtun et al 0809.4870, Shieh et al 0809.4494]

9. expanding strongly-coupled plasma [Janik-Peschanski, hep-th/0512162, hep-th/0606149, 0706.2108]

10. charged particles in strongly-coupled plasma: jet quenching [Liu-Rajagopal-Wiedemann, hep-ph/0605178, hep-ph/0612168],
    and/or
    string dragging [Karch et al hep-th/0605158; Casalderrey-Solana, Teaney, hep-ph/0605199; Gubser et al, hep-th/0605182, hep-th/0605292]

11. attempts to see a fermi surface in the gravity dual [Sung-Sik Lee 0809.3402; Rozali et al 0708.1322; Karch-Son-Starinets, Parnachev-Kulaxizi...]

12. finite-N effects: the stringy exclusion principle [Maldacena-Strominger, hep-th/9804085] and giant gravitons [McGreevy-Susskind-Toumbas, hep-th/0003075; Myers et al, hep-th/0008015; Itzhaki et al, hep-th/0008016.]

13. a solvable limit of AdS/CFT [BMN, hep-th/0202021;last section of hep-th/0309246; Gubser-Klebanov-Polyakov, hep-th/0204051]

14. spin chains and the dilatation operator [Minahan-Zarembo, hep-th/0212208 and its vast ocean of citations, especially Kruczenski, hep-th/0311203]

15. cusp anomalous dimension from string theory [Kruczenski, hep-th/0210115]

16. BPS Wilson loops [Erickson-Semenoff-Zarembo, hep-th/0003055, Drukker-Gross, hep-th/0010274]

17. $c \leq 1$ strings and matrix models, an example of holography [Kiritsis, chapter 15, review by Yu Nakayama, hep-th/0402009]

18. AdS_3 and 2d CFT [MAGOO §5, *e.g.* Maldacena-Ooguri, hep-th/0001053, hep-th/0005183, hep-th/0111180]

19. holography for large-N vector models? [Klebanov-Polyakov, hep-th/0210114]

20. behind the horizon by analyticity [Maldacena, 'eternal BH in AdS', hep-th/0106112; Shenker et al, hep-th/0306170; Festuccia-Liu, hep-th/0506202]

21. matrix models of black hole information con- sumption [Festuccia-Liu, hep-th/0611098; Iizuka-Polchinski et al, 0801.3657,0808.0530]

22. string theory and the physics of hadrons [Polchinski-Susskind, hep-th/0112204, Polchinski-Strassler et al, hep-th/0109174, hep-th/0209211, hep-th/0603115]

23. microscopic accounting of Bekenstein-Hawking entropy for BPS black holes [Strominger-Vafa, hep-th/9601029 et cit.]

24. Birkhoff/no-hair, quasinormal modes, and thermalization [Horowitz-Hubeny, hep-th/9909056]
    quasinormal modes and hydrodynamic modes [Kovtun-Starinets, hep-th/0506184]

25. computation of hydrodynamic green functions [Policastro-Son-Starinets, hep-th/0205052, 0210220]

26. anything else we don't get to in lecture that's on the syllabus.