Physics 690/482-02, Spring 2005 Josh Erlich
Final Project

For your final project you will examine an application of, an experimental or observational test of, or a constraint on extra dimensions. You have two options for presentation of what you learn:

1. **Presentation in class:** a 20 minute presentation followed by 5 minutes of questions.
2. **Written paper:** a typed paper of 5-10 single-spaced pages. Use LaTeX if you know how or want to learn. (Almost all technical physics papers these days are written in some version of LaTeX.)

Your presentation must begin with an explanation of the main objectives of the work which you review, followed by a description of that work, and ending with the conclusions of the work. You might also think about how the work could be generalized. This is how research projects often begin...

Grade: Your project grade will be based 50% on your demonstrated understanding of the material, and 50% on the quality of your presentation.

Due date: Papers will be due Monday, April 25. Presentations will take place two per class during the week of April 25, and also the previous week if more of you want to give oral presentations. You should decide on a topic by Friday, March 25. There will be not more than one oral presentation per topic. If you want to give an oral presentation, you should also choose a back-up topic in case of conflict.

Topics: There are many possible topics you can choose to review. Some of the possibilities are:

- C. Csáki, M. Graesser, C. F. Kolda and J. Terning, *Cosmology of one extra dimension with localized gravity*, hep-ph/9906513

  C. Csáki, M. Graesser, L. Randall and J. Terning, *Cosmology of brane models with radion stabilization*, hep-ph/9911406

  J. M. Cline, C. Grojean and G. Servant, *Cosmological expansion in the presence of extra dimensions*, hep-ph/9906523

- G. R. Dvali, G. Gabadadze and M. Porrati, *4D gravity on a brane in 5D Minkowski space*, hep-th/0005016

- A. Karch and L. Randall, *Locally localized gravity*, hep-th/0011156
- K. R. Dienes, *Shape versus volume: Making large flat extra dimensions invisible*, hep-ph/0108115
- I. I. Kogan, S. Mouslopoulos, A. Papazoglou, G. G. Ross and J. Santiago, *A three three-brane universe: New phenomenology for the new millennium?*, hep-ph/9912552

  I. I. Kogan, S. Mouslopoulos, A. Papazoglou and G. G. Ross, *Multi-brane worlds and modification of gravity at large scales*, hep-th/0006030
- S. Kachru, M. B. Schulz and E. Silverstein, *Self-tuning flat domain walls in 5d gravity and string theory*, hep-th/0001206

  N. Arkani-Hamed, S. Dimopoulos, N. Kaloper and R. Sundrum, *A small cosmological constant from a large extra dimension*, hep-th/0001197

  C. Csáki, J. Erlich and C. Grojean, *Gravitational Lorentz violations and adjustment of the cosmological constant in asymmetrically warped spacetimes*, hep-th/0012143
- E.G. Adelberger, B.R. Heckel, A.E. Nelson, *Tests of the gravitational inverse square law*, hep-ph/0307284
- P.J.S. Watson, *Bouncing neutrons and the neutron centrifuge*, hep-ph/0302239

  V. V. Nesvizhevsky and K. V. Protasov, *Constraints on non-Newtonian gravity from the experiment on neutron quantum states in the earth's gravitational field*, hep-ph/0401179
- Astrophysical or particle physics constraints on/searches for extra dimensions, *e.g.* references in the Csáki review: C. Csáki, *Extra dimensions and branes*, hep-ph/0404096