

The Adam J. Burgasser Endowed Chair in Astrophysics

P. I.: Scott A. Hughes

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1 Background: The role of chairs in gravitation theory

“Gravity is a great mystery. Drop a stone. See it fall. Hear it hit. No one understands why.” What a misleading statement! Mystery about fall? What else should the stone do except fall? (MTW, p. 13)

As modern gravity theories make clear, to fall is natural: All objects fall and fall equally, simply moving along the spacetime trajectory that they must follow — unless some object or force breaks their fall. Although it is only in the 16th century that they entered into truly common use, chairs have been used as a means of interrupting one’s free-fall for thousands of years¹. Properly used and situated, a chair allows one to work comfortably and happily while also adjusting the spacetime trajectory away from its “natural” state of free-fall.

2 The importance of a really great chair for research in astrophysics

Physics is simple only when analyzed locally. (MTW, p. 4)

There are few things I value in my research more than simplicity. MTW refers to simplicity in the geometric structure of a manifold. However, the wisdom of their statement goes far beyond this: One also must shut out all non-local distractions, such as email, telephones, news, and webcomics. The best way to do this is to create an environment in which these non-local disturbances are far, far removed. My analysis indicates that the Adam J. Burgasser chair provides an ideal local environment for astrophysics research. For proof, I refer to the 81 bibliographic entries dated 2006 and later that one finds for “Burgasser, A.” on ADS. Since this productivity cannot be ascribed to the home environment², the office environment must be particularly sublime. The conclusion is obvious: The Adam J. Burgasser Chair in Astrophysics is the ideal tool for accelerating one’s productivity in astrophysical research.

¹http://en.wikipedia.org/wiki/History_of_the_chair

²Indeed, much of that work was accomplished while sharing a home with Arthur Laughlin.

3 Management plan and personnel

Here is a listing of the personnel connected to this proposal, with their responsibilities and qualifications:

- *Scott A. Hughes, P. I.*: Hughes will have ultimate responsibility for the proper utilization of the Adam J. Burgasser chair. He will read, write, and think while sitting in the AJB Chair. Hughes has thought and published on matters of gravitational physics for many years with rather inadequate sitting arrangements. It is worth noting that Hughes' h -index is presently not at the stratospheric levels of Adam J. Burgasser; this can be ascribed at least in part to the lack of a really good chair³. Hughes will also be sure to include the phrase "SAH gratefully acknowledges the support of the Adam J. Burgasser Chair in Astrophysics in completing this analysis" in every paper written while holding this chair. For proof that he will carry this through, see the acknowledgments section of Dalal et al. (2005), in which Willie Nelson was acknowledged for his extraordinary (and poker-induced) contribution to our collaboration's travel budget.

4 Facilities and equipment

No special equipment is required to install and use the AJB Chair. However, upon award of this chair, Hughes will rearrange the furniture in his office in order that the AJB Chair can be given the prominence that it deserves.

5 References

- [1] C. W. Misner, K. S. Thorne, and J. A. Wheeler, *Gravitation* (W. H. Freeman and Company, San Francisco, 1973); referenced in the text as MTW.
- [2] N. Dalal, D. E. Holz, S. A. Hughes, and B. Jain, *Phys. Rev. D* **74**, 024027 (2006).

³Hughes does have a nice office couch; however, reading and thinking on this couch tends to rapidly evolve into napping on this couch.

Brief Curriculum Vitae for Scott A. Hughes

Education:

Ph. D., Physics, California Institute of Technology 1998
M. S., Physics, California Institute of Technology 1995
B. A. *summa cum laude*, Physics, Cornell University 1993

Employment:

Massachusetts Institute of Technology, Cambridge, MA:
Associate Professor of Physics, Jul 2008 – present
Assistant Professor of Physics, Jan 2003 – Jul 2008
Class of 1956 Career Development Professor, Jul 2005 – Jul 2008
Institute for Theoretical Physics, Santa Barbara, CA:
Postdoctoral Fellow, Sep 2000 – Dec 2002
California Institute of Technology, Pasadena, CA:
Postdoctoral Scholar and Lecturer in Physics, Sep 1999 – Aug 2000
University of Illinois, Urbana, IL:
Postdoctoral Research Associate in Physics, Sep 1998 – Aug 1999

Awards:

Kavli Fellow, National Academy of Sciences, 2009
MIT School of Science Teaching Award, 2006
MIT Department of Physics Teaching Award, 2005
Class of 1956 Career Development Professorship, 2005–2008
National Science Foundation Graduate Fellow, 1993–1995; 1996–1997
National Science Foundation Graduate Fellow, 1993–1995; 1996–1997

Professional Societies and Activities:

Member, American Astronomical Society
Member, American Physical Society
Member-at-Large, Topical Group on Gravitation Executive Committee, 2009–present
Member-at-Large, Division of Astrophysics Executive Committee, 2007–2009
Member, LISA International Science Team

Selected Publications Relevant to this Proposal:

1. N. Dalal, D. E. Holz, S. A. Hughes, and B. Jain, *Phys. Rev. D* **74**, 063006 (2006).

**Current and Pending Support for P. I.: Scott A. Hughes
Massachusetts Institute of Technology**

Current:

Title: CAREER: Beyond gravitational wave detection
Principle Investigator: Scott A. Hughes
Location of Project: Massachusetts Institute of Technology
Sponsoring Agency: NSF
Program Name: Faculty Early Career Development
Period of Award: July 1, 2005 – June 30, 2010
Total Award Amount: \$400,000
Commitment: 25%

Title: How well can LISA measure massive black hole binary inspirals?
Principle Investigator: Scott A. Hughes
Location of Project: Massachusetts Institute of Technology
Sponsoring Agency: NASA
Program Name: Research Opportunities in Space Science:
Astrophysics Theory and Fundamental Physics
Period of Award: July 1, 2008 – June 30, 2011
Total Award Amount: \$365,298
Hughes' commitment: 25%

Pending:

Title: The relativistic two-body problem via black hole perturbation theory
Principle Investigator: Scott A. Hughes
Location of Project: Massachusetts Institute of Technology
Sponsoring Agency: NSF
Program Name: Gravitation
Period of Award: July 1, 2010 – June 30, 2013
Total Award Amount: \$500,000
Hughes' commitment: 25%

Title: The Adam J. Burgasser Endowed Chair in Astrophysics (this proposal)
Principle Investigator: Scott A. Hughes
Location of Project: Massachusetts Institute of Technology
Sponsoring Agency: The Adam J. Burgasser Foundation
Period of Award: Sept 1, 2009 – ??
Hughes' commitment: 100%

Note that the commitment for pending awards sums to greater than 100% (i.e., more than full time commitment) due to the unique ability of the AJB Chair to facilitate multitasking.