

Baris Altunkaynak

Contact Information

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Academic Positions

Current

- **Assistant Teaching Professor**, Northeastern University (Jan 2019 - Present)
- **Introductory Physics Laboratory Supervisor**, Northeastern University (Jan 2016 - Present)

Past

- **Lecturer**, Northeastern University (Jan 2016 - May 2016)
- **Postdoctoral Research Associate**, University of Oklahoma (Aug 2012 - Sep 2015)
- **Adjunct Faculty**, Wentworth Institute of Technology (Jan 2012 - May 2012)
Northeastern University (Sep 2011 - May 2012)
- **Research/Teaching Assistant**, Northeastern University (Sep 2005 - May 2011)
- **Teaching Assistant**, Bogazici University (Sep 2002 - Aug 2005)

Education

- **Northeastern University**, Boston MA, USA
Ph.D. in Physics, May 2011
Thesis title: *Connecting String Theory to Particle Physics at the LHC*
Advisor: **Brent D. Nelson**
- **Bogazici University**, Istanbul, Turkey
M.S. in Physics, Aug 2005
Thesis title: *Spectral and Scattering Properties of Point Interactions*
Advisor: **O. Teoman Turgut**
- **Bogazici University**, Istanbul, Turkey
B.S. in Physics, Jul 2002
Undergraduate research: *Statistical Investigation of the Sources of Ultra High Energy Cosmic Rays*
Advisor: **Ibrahim Semiz**

Certificates

- Completed the online course “*An Introduction to Evidence-Based Undergraduate STEM Teaching*” with distinction offered by Vanderbilt University (Dec 2014).

Research Interests

Theoretical High Energy Particle Physics

- Models of electroweak symmetry breaking with a special focus on two Higgs doublet models. Theory and phenomenology of models with extended Higgs sectors and their collider signatures.
- New physics at the TeV scale, with a special focus on supersymmetric models. Signatures of new physics in current & future collider and dark matter experiments.
- Kinematic variables and mass measurement techniques for new physics at the LHC.

Grants

- American Physical Society (APS) grant for “Public Outreach and Informing the Public,” \$10,000
Matching grant from College of Science (COS), Northeastern University, \$10,000
(May 2018)
- Lodging Award for the Meeting of the Division of Particles & Fields (DPF 2015)
(August 2015)
- **XSEDE** Allocation Grant PHY120007,
Statistical Inference of the Parameters of Deflected Mirage Mediation in Light of the Latest Collider/non-Collider Observations
(November 2011 - November 2012)

Professional and Outreach Activities

- **Peer Review**
Physics Letters B
- **Judge in the VEX Robotics Competition**
Pinkerton Academy, Jan 5, 2019
- **Member of the Organizing Committee of BSM-LHC and SUSY 09**
Northeastern University, Jun 2-10, 2009
- **Judge in the 63rd Annual Citywide Boston Public Schools Science Fair**
Northeastern University, Mar 7, 2009
- **Graduate Student Representative**
Northeastern University (2008 - 2010)
- **Society Memberships**
American Physical Society (APS)

Publications

Books

1. **Hyde, Batishchev and Altunkaynak**, *Introductory Physics Laboratory*, Hayden-McNeil, 2017-2019.

Journal Articles

1. **B. Altunkaynak**, C. Kilic and M. Klimek
Multidimensional phase space methods for mass measurements and decay topology determination
· Eur. Phys. J **C77** (2017) no.2, 61 / [arXiv:1611.09764](#)
2. **B. Altunkaynak**, H. Baer, V. Barger and P. Huang
Distinguishing LSP archetypes via gluino pair production at LHC13
· Phys. Rev. D **92**, no. 3, 035015 (2015) / [arXiv:1507.00062](#)
3. **B. Altunkaynak**, W. S. Hou, C. Kao, M. Kohda and B. McCoy
Flavor Changing Heavy Higgs Interactions at the LHC
· Phys. Lett. B **751**, 135 (2015) / [arXiv:1506.00651](#)
4. D. Francescone, S. Akula, **B. Altunkaynak** and P. Nath
Sparticle Mass Hierarchies, Simplified Models from SUGRA Unification, and Benchmarks for LHC Run-II SUSY Searches
· JHEP **1501**, 158 (2015) / [arXiv:1410.4999](#)
5. **B. Altunkaynak**, C. Kao and K. Yang
Unveiling the MSSM Neutral Higgs Bosons with Leptons and a Bottom Quark
· Submitted to PLB / [arXiv:1312.3011](#)
6. S. Akula, **B. Altunkaynak**, D. Feldman, P. Nath and G. Peim
Higgs Boson Mass Predictions in SUGRA Unification and Recent LHC-7 Results
· Phys. Rev. D **85**, 075001 (2012) / [arXiv:1112.3645](#)
7. **B. Altunkaynak**, L. Everett, B. D. Nelson, W. Y. Rao and I. W. Kim
Landscape of Supersymmetric Particle Mass Hierarchies in Deflected Mirage Mediation
· Eur. Phys. J. Plus **127**, 2 (2012) / [arXiv:1011.1439](#)
8. **B. Altunkaynak**, M. Holmes, P. Nath, B. D. Nelson and G. Peim
SUSY Discovery Potential and Benchmarks for Early Runs at $\sqrt{s} = 7$ TeV at the LHC
· Phys. Rev. **D82**, 115001 (2010) / [arXiv:1008.3423](#)
9. **B. Altunkaynak**, L. L. Everett, I. W. Kim, B. D. Nelson and Y. Rao
Phenomenological Implications of Deflected Mirage Mediation: Comparison with Mirage Mediation
· JHEP **1005**, 054 (2010) / [arXiv:1001.5261](#)
10. P. Nath, **B. Altunkaynak et al.**
The Hunt for New Physics at the Large Hadron Collider
· Nucl. Phys. Proc. Suppl. **200-202**, 185 (2010) / [arXiv:1001.2693](#)
11. **B. Altunkaynak**
Selecting the Optimal LHC Signatures for Distinguishing Models
· AIP Conf. Proc. **1200**, 766 (2010) / [arXiv:0909.5246](#)
12. **B. Altunkaynak**, P. Grajek, M. Holmes, G. Kane and B. D. Nelson
Studying Gaugino Mass Unification at the LHC
· JHEP **0904**, 114 (2009) / [arXiv:0901.1145](#)

13. **B. Altunkaynak**, M. Holmes and B. D. Nelson
Solving the LHC Inverse Problem with Dark Matter Observations
· JHEP **0810**, 013 (2008) / [arXiv:0804.2899](#)
14. **B. Altunkaynak**, F. Erman and O. Teoman Turgut
Finitely Many Dirac-delta Interactions on Riemannian Manifolds
· J. Math. Phys. **47**, 082110 (2006) / [arXiv:hep-th/0607126](#)

Talks

- *Measuring Masses in Cascade Decays With the Help of Many-Body Phase Space* / **Invited Seminar**
University of Texas A&M, College Station TX, Nov 19, 2015
- *Flavor Violating Heavy Higgs Decays at the LHC* / DPF 2015
University of Michigan, Ann Arbor MI, Aug 7, 2015
- *Phenomenology of a Natural NUHM2 Model* / **Invited Seminar**
ATLAS SUSY general meeting (over Vidyo), Feb 26, 2015
- *Same Sign Diboson Signature* / Seminar
ATLAS SUSY Electroweak Subgroup (over Vidyo), Dec 12, 2014
- *Flavor Changing Heavy Higgs Interactions at the LHC* / Seminar
University of Oklahoma, Norman OK, Dec 4, 2014
- *Flavor Violating Decays of the Neutral Higgs bosons at the LHC* / PHENO 2014
University of Pittsburgh, Pittsburgh PA, May 5-7, 2014
- *Discovering the Neutral MSSM Higgs Bosons in $b\tau\tau$ Final State* / PHENO 2013
University of Pittsburgh, Pittsburgh PA, May 6-8, 2013
- *Discovering Supersymmetry at the LHC* / Journal Club
Northeastern University, Boston MA, Apr 6, 2011
- *Studying Gaugino Mass Unification at the LHC* / SUSY 09
Northeastern University, Boston MA, Jun 5-10, 2009
- *Connecting String Theory to Particle Physics at the LHC* / Journal Club
Northeastern University, Boston MA, Jan 14, 2009
- *Statistical Investigation of the Sources of Ultra High Energy Cosmic Rays* / Turkish Physical Society
Turkey, Sep 11-14, 2002

Conferences and Workshops

- Cottrell Scholars Collaborative - National Teaching Assistant Workshop
Georgia Institute of Technology, Atlanta GA, May 29-31, 2019
- DPF 2015
University of Michigan, Ann Arbor MI, Aug 4-8, 2015
- PHENO 2014
University of Pittsburgh, Pittsburgh PA, May 5-7, 2014

- PHENO 2013
University of Pittsburgh, Pittsburgh PA, May 6-8, 2013
- Boston Jet Physics Workshop
Harvard University, Cambridge MA, Jan 12-14, 2011
- Implications of First LHC Data
MIT, Cambridge MA, Aug 10-13, 2010
- SUSY 09
17th International Conference on Supersymmetry and the Unification of Fundamental Interactions
Northeastern University, Boston MA, Jun 5-10, 2009
- BSM-LHC
Beyond the Standard Model Physics and LHC Signatures
Northeastern University, Boston MA, Jun 2-4, 2009
- LHC New Physics Signatures Workshop
Michigan Center for Theoretical Physics, Ann Arbor MI, Jan 5-11, 2008
- New England Particle Physics Student Retreat VI
Craigville, Cape Cod MA, Aug 13-17, 2007
- Quantization, Dualities & Integrable Systems IV
Abant Izzet Baysal University, Bolu Turkey, Feb 1-4 2005
- TFD-21
21st Meeting of Turkish Physical Society
Suleyman Demirel University, Isparta Turkey, Sep 11-14, 2002.