

# PHYSICS AND ASTRONOMY

GRADUATE DIRECTOR: JACOBUS VERBAARSCHOT  
DEPARTMENT CHAIR: LASZLO MIHALY

## ❖ Grants, Fellowships, and Awards

**Faherty, Jacqueline.** (2010) National Science Foundation International Research Fellowship Program, \$150,000. *National Science Foundation*, Arlington, VA.

**Shim, H.** (2010) DAMOP 2010 Student Travel Support, \$500. *APS Division of Atomic, Molecular, and Optical Physics*, College Park, MD.

## ❖ Singly Authored Publications/Research Reports/Reviews

**Almeida, L.G.,** Sterman, G., Vogelsang, W. (2009) Threshold Resummation for Di-hadron Production in Hadronic Collisions. *Physical Review D80*: 074016.

**Dai, Peng,** Huang, Ru-Nan, Siegel, Warren. (2009) Covariant propagator in AdS<sub>5</sub> x S<sup>5</sup> superspace. *JHEP* 1003: 001.

**Faherty, Jacqueline,** Burgasser, Adam J., West, Andrew A., Bochanski, John J., Cruz, Kelle L., Shara, Michael M., Walter, Frederick M. (2010) The Brown Dwarf Kinematics Project. II. Details on Nine Wide Common Proper Motion Very Low Mass Companions to Nearby Stars. *The Astronomical Journal* 139: 176-194.

**Sung, Ilmo.** (2010) Probing the Gauge Content of Heavy Resonances with Soft Radiation. *Physical Review D80*: 094020.

## ❖ Jointly Authored Publications/Research Reports/Reviews

**Allred, C.S.,** Reeves, J., Corder, C., Metcalf, H. (2010) Atom lithography with metastable helium. *Journal of Applied Physics* 107: 033116.

McCoy, B.M., **Assis, M.,** Boukraa, S., Hassani, S., Maillard, J.-M., Orrick, W.P., Zenine, N. (2010) The saga of the Ising susceptibility. [*arXiv:1030.0751 [math-ph]*].

**Azmoun, B.,** Caccavano, A., Citron, Z., Durham, M., Hemmick, T., Kamin, J., Rumore, M., Woody, C. (2009) Collection of photoelectrons and operating parameters of CsI photocathode GEM detectors. *IEEE Transactions Nuclear Science* 56: 1544.

**Casalderrey-Solana, Jorge,** Kim, Keun-Young, Teaney, Derek. (2009) Stochastic String Motion Above and Below the World Sheet Horizon. *JHEP* 0912: 066 [*arXiv:0908.1470 [hep-th]*].

**Cho, Sungtae** and Zahed, Ismail. (2009) Classical Strongly Coupled QGP: VII. Shear Viscosity and Self Diffusion. [*arXiv:0910.2666 [nucl-th]*].

**Cho, Sungtae** and Zahed, Ismail. (2009) Classical Strongly Coupled QGP. VII. Energy Loss. [*arXiv:0910.1548 [nucl-th]*].

**Cho, Sungtae** and Zahed, Ismail. (2009) Classical strongly coupled QGP: VI. Structure Factors. [*arXiv:0909.4725 [nucl-th]*].

**Clow, S.D.,** Holscher, U.C., Weinacht, T.C. (2009) Achieving 'perfect' molecular discrimination via coherent control and stimulated emission. *New Journal of Physics* 11: 115007.

- Azmoun, B., Caccavano, A., **Citron, Z.**, Durham, M., Hemmick, T., Kamin, J., Rumore, M., Woody, C. (2009) Collection of photoelectrons and operating parameters of CsI photocathode GEM detectors. *IEEE Transactions Nuclear Science* 56: 1544.
- Holscher, U.C., **Clow, S.D.**, Weinacht, T. (2009) Ultrafast atomic phase modulation. *Physical Review A* 80: 011812.
- Allred, C.S., Reeves, J., **Corder, C.**, Metcalf, H. (2010) Atom lithography with metastable helium. *Journal of Applied Physics* 107: 033116.
- Crichigno, Marcos P.**, Shuryak, Edward. (2009) Quantum Corrections to Multi-Quanta Higgs-Bags in the Standard Model. [*arXiv:0909.5629 [hep-ph]*].
- Dong, H.**, Kuo, T.T.S, Machleidt, R. (2009) Neutron stars, stable ring diagram equation of state, and Brown-Rho scaling. *Physical Review C* 80: 065803.
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- Azmoun, B., Caccavano, A., Citron, Z., **Durham, M.**, Hemmick, T., Kamin, J., Rumore, M., Woody, C. (2009) Collection of photoelectrons and operating parameters of CsI photocathode GEM detectors. *IEEE Transactions Nuclear Science* 56: 1544.
- Aad, G. **et al.\*** (2010) Charged-particle multiplicities in pp interactions at  $\sqrt{s} = 900$  GeV measured with the ATLAS detector at the LHC. *Physics Letters B* 688: 21. [*arXiv:1003.3124 [hep-ex]*].
- Aaltonen, T **et al.\*** (2010) Combined Tevatron upper limit on  $gg \rightarrow H \rightarrow W+W-$  and constraints on the Higgs boson mass in fourth-generation fermion models. [*arXiv:1005.3216 [hep-ex]*].
- Aaltonen, T **et al.\*** (2010) Combination of Tevatron searches for the standard model Higgs boson in the  $W+W-$  decay mode. *Physical Review Letters* 104: 061804. [*arXiv:1001.4481 [hep-ex]*].
- Abazov, Victor Mukhamedovich **et al.\*** (2010) Evidence for an anomalous like-sign dimuon charge asymmetry. [*arXiv:1005.2757 [hep-ex]*].
- Abazov, Victor Mukhamedovich **et al.\*** (2010) Search for scalar bottom quarks and third-generation leptoquarks in p p-bar collisions at  $\sqrt{s} = 1.96$  TeV. [*arXiv:1005.2222 [hep-ex]*].
- Abazov, Victor Mukhamedovich **et al.\*** (2010) Search for Randall-Sundrum gravitons in the dielectron and diphoton final states with 5.4 fb<sup>-1</sup> of data from p p-bar collisions at  $\sqrt{s} = 1.96$  TeV. [*arXiv:1004.1826 [hep-ex]*].
- Abazov, V. M. **et al.\*** (2010) Measurement of the dijet invariant mass cross section in  $\overline{p}p$  collisions at  $\sqrt{s} = 1.96$  TeV. [*arXiv:1002.4917 [hep-ex]*].
- Abazov, V. M. **et al.\*** (2010) Measurement of the dijet invariant mass cross section in  $\overline{p}p$  collisions at  $\sqrt{s} = 1.96$  TeV. [*arXiv:1002.4594 [hep-ex]*].
- Abazov, V. M. **et al.\*** (2010) b-Jet Identification in the D0 Experiment. [*arXiv:1002.4224 [hep-ex]*].
- Abazov, V. M. **et al.\*** (2010) Search for Higgs boson production in dilepton and missing energy final states with 5.4 fb<sup>-1</sup> of p-pbar collisions at  $\sqrt{s} = 1.96$  TeV. *Physical Review Letters* 104: 061804. [*arXiv:1001.4481 [hep-ex]*].
- Abazov, V. M. **et al.\*** (2010) Dependence of the  $t\bar{t}$  production cross section on the transverse momentum of the top quark. [*arXiv:1001.1900 [hep-ex]*].
- Abazov, V. M. **et al.\*** (2010) Search for the standard model Higgs boson in the  $ZH \rightarrow \nu \bar{\nu} b \bar{b}$  channel in 5.2 fb<sup>-1</sup> of p p-bar collisions at  $\sqrt{s} = 1.96$ -TeV. *Physical Review Letters* 104: 071801. [*arXiv:0912.5285 [hep-ex]*].
- Abazov, V. M. **et al.\*** (2010) Double parton interactions in photon+3 jet events in p p-bar collisions  $\sqrt{s} = 1.96$  TeV. *Physical Review D* 81: 052012. [*arXiv:0912.5104 [hep-ex]*].

- Abazov, V. M. **et al.**\* (2010) Search for single top quarks in the tau+jets channel using  $4.8 \text{ fb}^{-1}$  of p-pbar collision data. [*arXiv:0912.1066 [hep-ex]*].
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- Abazov, V. M. **et al.**\* (2009) Search for charged Higgs bosons in top quark decays. *Physics Letters B* 682: 278. [*arXiv:0908.1811 [hep-ex]*].
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- Abazov, V. M. **et al.**\* (2009) Combined measurements of anomalous charged trilinear gauge-boson couplings from diboson production in p anti-p collisions at  $s^{1/2}=1.96\text{-TeV}$ . [*arXiv:0907.4952 [hep-ex]*].
- Abazov, V. M. **et al.**\* (2009) Measurement of trilinear gauge boson couplings from  $WW + WZ \rightarrow l \nu j j$  events in p anti-p collisions at  $s^{1/2} = 1.96 \text{ TeV}$ . *Physical Review D* 80: 053012. [*arXiv:0907.4398 [hep-ex]*].
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- Abazov, V. M. **et al.**\* (2009) A Novel method for modeling the recoil in W boson events at hadron collider. *Nuclear Instrumentation Methods A* 609: 250. [*arXiv:0907.3713 [hep-ex]*].
- Abazov, V. M. **et al.**\* (2009) Search for pair production of first-generation leptoquarks in p anti-p collisions at  $s^{1/2} = 1.96\text{-TeV}$ . *Physics Letters B* 681: 224. [*arXiv:0907.1048 [hep-ex]*].
- Abazov, V. M. **et al.**\* (2009) Search for charged Higgs bosons in decays of top quarks. *Physical Review D* 80: 051110. [*arXiv:0906.5326 [hep-ex]*].
- Abazov, V. M. **et al.**\* (2009) Measurement of dijet angular distributions at  $s^{1/2} = 1.96\text{-TeV}$  and searches for quark compositeness and extra spatial dimensions. *Physical Review Letters* 103: 191803. [*arXiv:0906.4819 [hep-ex]*].
- Abazov, V. M. **et al.**\* (2009) Search for Resonant Pair Production of long-lived particles decaying to b anti-b in p anti-p collisions at  $s^{1/2} = 1.96\text{-TeV}$ . *Physical Review Letters* 103: 071801. [*arXiv:0906.1787 [hep-ex]*].
- Abazov, V. M. **et al.**\* (2009) Direct measurement of the mass difference between top and antitop quarks. *Physical Review Letters* 103: 132001. [*arXiv:0906.1172 [hep-ex]*].
- Abazov, V. M. **et al.**\* (2009) Search for squark production in events with jets, hadronically decaying tau leptons and missing transverse energy at  $s^{1/2}$ . *Physics Letters B* 680: 24. [*arXiv:0905.4086 [hep-ex]*].
- Abazov, V. M. **et al.**\* (2009) Search for NMSSM Higgs bosons in the  $h \rightarrow aa \rightarrow \mu\mu\mu\mu, \mu\mu\tau\tau$  channels using p anti-p collisions at  $s^{1/2}=1.96 \text{ TeV}$ . *Physical Review Letters* 103: 061801. [*arXiv:0905.3381 [hep-ex]*].

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- Adare, A. **et al.**\* (2010) Measurement of neutral mesons in p+p collisions at  $\sqrt{s} = 200$  GeV and scaling properties of hadron production. [arXiv:1005.3674 [hep-ex]].
- Adare, A. **et al.**\* (2010) Nuclear modification factors of phi mesons in d+Au, Cu+Cu and Au+Au collisions at  $\sqrt{s_{NN}}=200$  GeV. [arXiv:1004.3532]
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- (NOTE: \* denotes a citation with a vast amount of authors. Between 5-10 SBU Physics students are included in “**et al**”)

❖ **Abstracts, Conferences/Colloquia, Presentations, Symposiums, Workshops**

- Caputo, Regina** (on behalf of ATLAS Liquid Argon Calorimeter Group). (2010) Uniformity Studies of the ATLAS Electromagnetic Calorimeter using Cosmic Ray Muons. *American Physical Society*. Washington, D.C.
- Dong, H.**, Kuo, T.T.S, Machleidt, R. (2009) Neutron star and  $\beta$ -stable EOS with Brown-Rho scaled low-momentum NN interactions. *The 3rd JPS/DNP Meeting*. Hilton Waikoloa Village, Big Island, HI.
- Faherty, Jacqueline** (2009) Learning from the Motions of Ultracool Dwarfs: Companions, Ages, Higher Order Multiplicity. *Recipes for making brownies: theory vs. observations*. ESA-ESTEC, Noordwijk, Netherlands.
- Faherty, Jacqueline** (2010) The Brown Dwarf Kinematics Project (BDKP): Proper Motions and Parallaxes of a Select Sample of Ultracool Dwarfs. *AAS Meeting #215*. Washington, D.C. (poster)
- Gadway, Bryce**, Pertot, Daniel, Reimann, R., Schneble, D. (2009) Implementing the single-species two-component Bose-Hubbard model in an optical lattice. *DAMOP 2009*. Charlottesville, VA.
- Pertot, Daniel, **Gadway, B.**, Reimann, R., Schneble, D. (2009) Mott insulator transition of two-component bosons in a state-dependent optical lattice. *DAMOP 2009*. Charlottesville, VA.

- Pertot, Daniel, **Gadway, B.**, Reimann, R., Schneble, D. (2010) Two-component Bosons in Spin-dependent Optical Lattices. *NewSpin 2010: Spin manipulation in cold atoms and condensed matter*. Utrecht, The Netherlands.
- Bergeman, T., Shim, H., Pertot, D., **Gadway, B.**, Schneble, D. (2010) A Study of Nonadiabatic Effects When a 1D Optical Lattice is Turned on Rapidly. *DAMOP*. Houston, TX.
- Jackson, A.P.**, Calder, A.C., Townsley, D.M., Chamulak, D.A., Brown, E.F., & Timmes, F.X. (2010) Evaluating Systematic Effects of Type Ia Supernovae: The Influence of Deflagration to Detonation Density. *ASNY Spring Meeting*. Hamilton, NY.
- Jackson, A.P.**, Calder, A.C., Townsley, D.M., Chamulak, D.A., Brown, E.F., & Timmes, F.X. (2010) Evaluating Systematic Dependencies of Type Ia Supernovae: The Influence of Deflagration to Detonation Density. *AAS Meeting #215*. Washington, D.C. (poster)
- Jackson, A.P.**, Calder, A.C., Townsley, D.M. (2009) The Role of the Transition Density in the Deflagration to Detonation Paradigm of Type Ia Supernovae. *KITP Stellar Death and Supernovae*. Santa Barbara, CA. (poster)
- Krueger, B.K., Calder, A.C., Townsley, D.M., **Jackson, A.P.**, Brown, E.F. (2009) Dependence of Type Ia Supernovae on Progenitor Central Density. *KITP Stellar Death and Supernovae*. Santa Barbara, CA. (poster)
- Kamin, Jason**. (2009) Characterizing cold nuclear matter effects through dielectrons in d+Au collisions at PHENIX. *APS/JPS DNP 2009*. Waikoloa, Hawaii.
- Krueger, B.K.**, Calder, A.C., Townsley, D.M., Jackson, A.P., Brown, E.F. (2009) Dependence of Type Ia Supernovae on Progenitor Central Density. *KITP Stellar Death and Supernovae*. Santa Barbara, CA. (poster)
- Pertot, Daniel**, Gadway, B., Reimann, R., Schneble, D. (2009) Mott insulator transition of two-component bosons in a state-dependent optical lattice. *DAMOP 2009*. Charlottesville, VA.
- Pertot, Daniel**, Gadway, B., Reimann, R., Schneble, D. (2010) Two-component Bosons in Spin-dependent Optical Lattices. *NewSpin 2010: Spin manipulation in cold atoms and condensed matter*. Utrecht, The Netherlands.
- Gadway, Bryce, **Pertot, Daniel**, Reimann, R., Schneble, D. (2009) Implementing the single-species two-component Bose-Hubbard model in an optical lattice. *DAMOP 2009*. Charlottesville, VA.
- Bergeman, T., Shim, H., **Pertot, D.**, Gadway, B., Schneble, D. (2010) A Study of Nonadiabatic Effects When a 1D Optical Lattice is Turned on Rapidly. *DAMOP*. Houston, TX.
- Bergeman, T., **Shim, H.**, Pertot, D., Gadway, B., Schneble, D. (2010) A Study of Nonadiabatic Effects When a 1D Optical Lattice is Turned on Rapidly. *DAMOP*. Houston, TX.
- Shim, H.**, Bergeman, T. (2009) The Dynamics of Squeezed Coherent States in the Superfluid-Mott Insulator Phase Transition. *DAMOP*. Charlottesville, VA.
- Shim, H.**, Bergeman, T. (2010) The Dynamics of Two-component BECs Loaded in an Optical Lattice: Truncated Wigner Approximation. *DAMOP*. Houston, TX.
- Tschann-Grimm, Kathryn**. (2010) Search for the Standard Model Higgs Boson in the tau tau qbar q Final State. *American Physical Society April Meeting*. Washington, D.C.

❖ **Post-Doctorates Obtained and Professional Appointments**

- Faherty, Jacqueline**. (2010) NSF International Post-doctoral Appointment. *Universidad de Chile/Boston University*, Santiago, Chile and Boston, MA.
- Huang, Xiaojing**. (2010) Post-doctoral Research Associate. London Centre for Nanotechnology, *University College London*, London, UK.

**Almeida, Leandro.** (2010) Post-doctoral Research Associate. *Institut Physique Theorique*, Saclay, France.

**Lin, Shu.** (2010) Post-doctoral Research Associate. *Max Planck Institute*, Munich, Germany.

**Sung, Ilmo.** (2010) Post-doctoral Research Associate. *University of Maryland*, College Park, MD.

**Young, Clint.** (2010) Post-Doctoral Research Associate. *Mcgill University*, Montreal, QB.