Reyco Henning Curriculum Vitae

Physics Interests

Searches for neutrinoless double-beta decay, direct and indirect WIMP dark matter searches, underground and low-background experiments, searches for rare, exotic processes.

Education

- **2003, PhD, Massachusetts Institute of Technology,** Experimental High-Energy Physics. Thesis Supervisor: Prof. Ulrich Becker. Thesis Topic: "Search for Anti-Deuterium and Strangelets in Cosmic-rays with AMS-01".

- **1998, B.S. University of Denver**, with Honors, Magna Cum Laude, Majors: Physics, Mathematics. Minor: Astronomy.

Employment

- **2007—Present: University of North Carolina – Chapel Hill: Assistant Professor:** Experimental nuclear and particle astrophysics.

- **2003—2006: Lawrence Berkeley National Laboratory: Postdoctoral Fellow:** Neutrino Astrophysics Group. Advisor: Dr. Kevin Lesko.

- **1998—2003: Massachusetts Institute of Technology: Graduate Research Assistant:** Alpha Magnetic Spectrometer (AMS) group

- **Summer, 1997: Geophysical Fluid Dynamics Laboratory: Research Assistant,** Princeton, NJ

- **Summer, 1996: High Altitude Observatory, NCAR: Research Assistant** Boulder, CO

- **1994—1998: University of Denver: Research Assistant**

Honors

- Phi Beta Kappa, Sigma Pi Sigma.
- Herbert J. Greenberg Award for Outstanding Mathematics Major at the University of Denver, 1997.
- Chester Alter International Scholar Award (full tuition for 4 years) from the University of Denver, 1994.

Professional Memberships

- The MAJORANA Collaboration (2003-current)
- The DEAP/CLEAN Collaboration (2007-current)
- The Sudbury Neutrino Observatory Collaboration (2004-2006).
- The 2004 APS Neutrino Study Working Group.
- The Alpha Magnetic Spectrometer (AMS) Collaboration (1998-2003).

Administrative and Advising Roles

- Chair, MAJORANA Experiment Executive Committee (elected) 2007-2008, 2010-2011
- UNC Society of Physics Students Advisor: 2007-2009
- UNC Academic Advisor for Physics Majors. 2007-2009

Teaching

Spring 2007: PHYS 128 “Modern Physics”
Fall 2007: PHYS 128 “Modern Physics”
Spring 2008: PHYS 321 “Introduction to Quantum Mechanics”
Fall 2008: PHYS 128 “Modern Physics”
Spring 2009: PHYS 321 “Introduction to Quantum Mechanics”
Fall 2009: PHYS 721 “Quantum Mechanics” (graduate)
Fall 2010: PHYS 521 "Applications of Quantum Mechanics"

Students Supervised

Postdoc: Michael Akashi-Ronquest (now LANL), Melissa Boswell (now LANL)

Graduate: Padraic Finnerty (MS 2008), Sean MacMullin (MS 2009),

Undergraduate: Ivan Pogrebnyak (current), Benjamin Laroque (Now Los Alamos), Kalissa Andre (now Penn State), David Kaleko (current), Lenny Evans (current), Rebecca Holmes (current), Alex Long (now Boston U.), Kevin Macon (now LSU), Austin Stevens, Emily Morgan (2007 SURF recipient, now UNC), Michael Brown (TUNL REU 2010), Shauna Marquess (TUNL REU 2008), Kimberley Venta (TUNL REU 2007), Michelle Perry, Kai Hudek

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Other Activities and Qualifications.

- SCUBA (Advanced Open Water SSI certified), squash, ice–hockey, backpacking, banjo playing.

Reyco Henning
Bibliography

Refereed Publications

1) "Low-background gamma counting at the Kimballton Underground Research Facility", P. Finnerty et al, submitted to *Nucl. Instr. and Methods A.*

2) "A Pulse Shape Analysis Technique for the MAJORANA Experiment", R.J. Cooper et al, *Nucl. Instr. and Methods A* (in press) DOI: 10.1016/j.nima.2010.11.029

3) "MAGE - a GEANT 4-based Monte Carlo Application Framework for Low-background Germanium Experiments", M. Boswell et al, accepted to *IEEE Trans. Nucl. Sci.*

4) "Reconstruction of a Radiation Point Source's Radial Location Using Goodness-of-Fit Test on Spectra Obtained from an HPGe Detector", L.T. Evans, K. Andre, R. De, R. Henning, E.D. Morgan, *Nuclear Instr. and Methods B* **267** (2009) 3688

5) "Measurement of the Cosmic Ray and Neutrino-Induced Muon Flux at the Sudbury Neutrino Observatory." The SNO collaboration, *Phys. Rev. D* **80** (2009) 012001

6) "An Independent Measurement of the Total Active 8B Solar Neutrino Flux at the Sudbury Neutrino Observatory Using an Array of He Proportional Counters" The SNO collaboration, *Phys. Rev. Lett.* **101** (2008) 111301

7) *"*A Generic Surface Sampler for Monte Carlo Simulations*"* J. A. Detwiler, R. Henning, R. A. Johnson, M. G. Marino. *IEEE Trans. Nucl .Sci.* **55** (2008) 2329

8) "Evaluation of radioactive background rejection in 76Ge neutrino-less double-beta decay experiments using a highly segmented HPGe detector" Campbell et al, *Nuclear Instr. and Methods A* **587** (2008) 60

9) "Validation of spallation neutron production and propagation within Geant4", M. Marino et al, *Nuclear Inst. and Methods A* **582** (2007) 611

10) "Measurement of the ν_e and Total ^{8}B Solar Neutrino Fluxes with the Sudbury Neutrino Observatory Phase I Data Set" The SNO collaboration, *Phys. Rev. C* **75** (2007) 045502

11) "A Search for Neutrinos from the Solar hep Reaction and the Diffuse Supernova Neutrino Background with the Sudbury Neutrino Observatory", The SNO collaboration, *Astrophys. J.* **653** (2006) 1545

12) "The AMS-02 Transition Radiation Detector," Ph.v Doetinchem et al, *Nuclear Instr. and Methods A*, **558** (2006) 526

13) "A Study of Cosmic Ray Secondaries Induced by the Mir Space Station Using AMS-01," The AMS-01 Collaboration, *Nuclear Instr. and Methods B*, **234** (2005) 321

14) "The AMS-02 TRD for the International Space Station", Hauler, F. et al. *IEEE Trans. Nucl. Sci.* **51** (2004) 1365

15) "Helioseismic constraints on the structure of the solar tachocline", Charbonneau, P., Christensen-Dalsgaard, J., **Henning, R.**, Larsen, R.M., Schou, J., Thompson, M.J., and Tomczyk, S, *Astrophys. J.* **527** (1999) 445

Other Publications and Reports

"Neutrinoless double beta decay and direct searches for neutrino mass," Aalseth et al, Report by the Neutrinoless Double Beta Decay and Direct Search for Neutrino Mass Working Group of the APS Multidivisional Neutrino Study, Nov. 2004, hep-ph/0412300

Invited Talks, Seminars, and Colloquia

1) "Shining light through walls – searching new fundamental particles at HIGS," R. Henning, TUNL Seminar, Duke University, Durham, NC (2010)

2) "Double-beta decay at DUSEL," R. Henning, Annual DuRA Meeting and DUSEL PDR Rollout, Fermilab, Batavia, IL (2010)

3) "North American Underground Facilities," R. Henning, Topical Workshop in Low Radioactivity Techniques, SNOLAB, Sudbury, Ontario (2010)

4) "Searching for the rarest events in the Universe," R. Henning, Advances in Physics Seminar, Duke University, Durham, NC (2010)

5) "Direct Detection of Dark Matter", R. Henning, Southeastern Section of the APS 2009, Atlanta, GA (2009)

6) "Overview of current and proposed searches for double-beta decay", R. Henning, Neutrinos and Dark Matter 2009, Madison, WI (2009)

7) "Quest for the nature of the neutrino", R. Henning, Colloquium at U. of Denver, Denver, CO (2009)

8) "Searching for the rarest events in the universe and other fun topics in particle astrophysics", R. Henning, Colloquium at UNC Chapel Hill, Chapel Hill, NC (2009)

9) "Searching for the rarest events in the universe and other fun topics in particle

astrophysics", R. Henning, Colloquium at NCA&T, Greensboro, NC (2008)

10)"The Dark Matter Puzzle and Proposed Experimental Solutions", R. Henning, Advances in Physics Seminar, Duke University, Durham, NC (2008)

11)"Reach of Future Non-accelerator Neutrino Efforts", R. Henning, Flavor Physics and CP Violation 2008, Taipei, Taiwan (2008), arXiv:0807.1291v1 [hep-ex]

12)"Neutrinoless Double-Beta Decay", R. Henning, 76th Annual Meeting of the Southeastern Section of the APS, Nashville, TN (2007)

13)"Quest for the Nature of The Neutrino", R. Henning, Colloquium at UNC Wilmington, Wilmington, NC (2007)

14)"Overview and Status of the Majorana Experiment", International Workshop on "Double Beta Decay and Neutrino Mass", Osaka, Japan (2007)

15)"Quest for the Nature of The Neutrino", R. Henning, Nuclear and Particle Physics Colloquium, Massachusetts Institute of Technology, Cambridge, MA (2007)

16)"Quest for the Nature of The Neutrino", R. Henning, Seminar at University of Maryland, Greenbelt, MD (2007)

17)"Quest for the Nature of The Neutrino", R. Henning, Colloquium at Colorado State University, Fort Collins, CO (2006)

18) "Quest for the Nature of The Neutrino", R. Henning, Seminar at Virginia Polytechnic Institute and State University, Blacksburg, VA (2006)

19) "Quest for the Nature of The Neutrino", R. Henning, Colloquium at UNC Chapel Hill, Chapel Hill, NC (2006)

Pre-2006:

Joint APS/JPS Workshop, Maui HI, September 2005
Lawrence Berkeley National Laboratory, CA, August 2005
Lawrence Berkeley National Laboratory, CA, October 2004
Lawrence Berkeley National Laboratory, CA, March 2003
California Institute of Technology, March 2003
University of Hawai`i, February 2003
University of Pennsylvania, February 2003

Contributed Conference Talks, Proceedings, and Posters

1) "Background Model for the MAJORANA DEMONSTRATOR" **R. Henning** on behalf of the MAJORANA Collaboration, Poster Presentation at Neutrino 2010, Athens, Greece, 2010.

2) "The Majorana Demonstrator: An R&D project towards a tonne-scale germanium neutrinoless double-beta decay search" **R. Henning** et al, Conference Presentation at CIPANP 2009, San Diego, CA, June 2009. AIP Conf.Proc.1182:88-91, 2009

3) "The Majorana Demonstrator: An R&D project towards a tonne-scale germanium neutrinoless double-beta decay search" **R. Henning** et al, Conference Presentation at APS Meeting, Denver, CO, May 2009.

4) "The Majorana Neutrinoless Double-beta Decay Experiment: **R. Henning** et al, Conference Presentation at APS April Meeting, Jacksonville, FL, April 2007.

5) "MaGe, a Simulation Framework for germanium based Neutrinoless Double-beta Decay Experiments." **R. Henning** et al, Poster presentation at IEEE-NSD, San Diego, CA, October 2006

6) "MaGe, a Simulation Framework for ^{76}Ge-based Neutrinoless Double-beta Decay Experiments." **R. Henning** et al, Poster presentation at Neutrino 2006, Santa Fe, NM, June 2006

7) "Study of a Highly-segmented HPGe Detector at the Oroville Low-Background Counting Facility." **R. Henning,** Conference Presentation at APS Meeting, Dallas, TX, April 2006.

8) "Background Reduction in the Majorana Neutrinoless Double-Beta Decay Experiment." **R. Henning** for the Majorana Collaboration, Conference Presentation at DNP 2005, Maui, HI, September 2005.

9) "The Majorana Neutrinoless Double-beta Decay Experiment." **R. Henning** for the Majorana Collaboration. Conference Presentation at APS Meeting, Tampa, FL, April 2005.

10) "Simulation for the Majorana Zero Neutrino Double-Beta Decay Experiment." **R. Henning** for the Majorana Collaboration. Conference presentation at DNP 2004, Chicago, IL, October 2004.

11) "The Simulation of the Majorana Neutrinoless Double-beta Decay Experiment" **R. Henning** for the Majorana Collaboration. Poster Presentation at Neutrino 2004, Paris, France, June, 2004. *Nuclear Physics B (Proc. Suppl.)* **143** (2005) 544

12) "The AMS-02 Experiment," **R. Henning** for the AMS Collaboration, Conference presentation at the Lake Louise Winter Institute, Alberta, Canada, February 2003.

13) "Design and Performance of a Future Space Based Transition Radiation Detector", **R. Henning**, Conference presentation at DPF/APS at The College of William and Mary, May 2002.

14) "Using Neural Networks to Determine Impact Locations of Heavy Ions", **R. Henning** and R. Davies, Conference Presentation at APS, Four Corners Section Spring Meeting, U. of New Mexico, Albuquerque, NM, April 1998

15) "Observational constraints on the dynamical properties of the shear layer at the base of the solar convection zone", Charbonneau, P., Christensen-Dalsgaard, J., **Henning, R.**, Schou, J., Tomczyk, S., and Thompson, M.J. 1996, in IAU Symp. 181: Sounding solar and stellar interiors (Poster volume, eds. J. Provost & F.-X. Schmider, 161-162, 1998).