MARK S. NEUBAUER

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EDUCATION

PhD University of Pennsylvania, Physics   June 2001
Dissertation: *Evidence for Electron Neutrino Flavor Change through
Measurement of the $_8$B Solar Neutrino Flux at SNO*
Advisor: Dr. Eugene Beier

BS Kutztown University, Physics   May 1994
Graduated *Summa Cum Laude*

PROFESSIONAL APPOINTMENTS

University of Illinois at Urbana-Champaign, Urbana, IL USA

Affiliate Professor	Department of Electrical and Computer Engineering	2019 –
Affiliate Professor	National Center for Supercomputing Applications	2018 –
Professor	Department of Physics	2018 –
Associate Professor	Department of Physics	2013 – 2018
Assistant Professor	Department of Physics	2007 – 2013

University of California at San Diego, La Jolla, CA USA

Postdoctoral Fellow	Department of Physics	2003 – 2007

Massachusetts Institute of Technology, Cambridge, MA USA

Postdoctoral Fellow	Department of Physics	2001 – 2003

HONORS AND AWARDS

Breakthrough Prize in Fundamental Physics	2016
Dean's Award for Excellence in Research (U. Illinois)	2013
Fellow, Center for Advanced Study (U. Illinois)	2012 – 2013
NSF Career Award	2011
Fellow, National Center for Supercomputing Applications	2008 – 2009
Arnold O. Beckman Research Award (U. Illinois)	2007
Member, Sigma Xi (Massachusetts Institute of Technology)	2002
Chairman's Teaching Award (University of Pennsylvania)	1995

PROFESSIONAL SERVICE & LEADERSHIP

Member, Center for Artificial Intelligence Innovation (NCSA)	2019 –

Executive Committees / Coordination Groups (current)

Science Responds to the COVID-19 Pandemic	*2020 –*
Fast Machine Learning Laboratory	*2019 –*
Institute for Research and Innovation in Software for High-Energy Physics	*2018 –*
High-Energy Physics Software Foundation	*2016 –*
Open Science Grid	*2015 –*

Workshop Organization (selected)

Fast Machine Learning and Inference (Fermilab)	*2019*
Building Collaborations for Machine Learning (MIT)	*2017*
Practice & Experience in Advanced Research Computing (New Orleans)	*2018*

Research Award Leadership (selected, recent)

Principle Investigator (PI), *Illinois Tier-2 Computing Center*	*2019 –*
Co-PI, *Advancing Science with Accelerated Machine Learning*	*2019 –*
PI, *Scalable Cyberinfrastucture for AI and Likelihood-Free Inference*	*2018 –*
PI, *Conceptualization of a Software Innovation Institute for HEP*	*2015 –* 2018
Co-PI, *Data and Software Preservation for Open Science*	*2012 –* 2016
Co-PI, MRI: Development of Ultrafast Tracking Electronics for ATLAS	2011 – 2017

RESEARCH HIGHLIGHTS

Diboson Production as a Sensitive Probe of New Physics   2007 –

My group is at the forefront of studying diboson production at colliders, producing:
- Stringent limits on production of new particles decaying to heavy boson pairs (*WW*, *WZ*, *ZZ*, *hW*, *hZ*) and constraints on new physics at the LHC [PRD 98 (2018), JHEP 1803 (2018), PLB 765 (2017), JHEP 1609 (2016), PLB 755 (2016), JHEP 1601 (2016), EPJC 76 (2015), EPJC 75 (2015), JHEP 1501 (2015), PLB 737 (2014), PLB 718 (2012), PRL 107 (2011)]
- First measurement of ZZ at a hadron collider [PRL 100 (2008) 201801)]
- First observation of WZ production [PRL 98 (2007) 161801)]

I have also authored two review articles on tests of electroweak physics [RMP 84 (2012) 1477] and diboson physics at colliders [ARNPS 61 (2011) 223]

Higgs Boson Discovery   2012

The ATLAS and CMS experiments announced the discovery of a Higgs boson *h*. This discovery lead to the 2013 Nobel Prize in Physics for its theoretical prediction
- My group contributed to this discovery [PLB 716 (2012) 1] through analysis of the $h{\to}WW^*{\to}e\nu\mu\nu$ channel and $h{\to}WW^*$ observation [PRD 92 (2015) 012006], providing the most precise channel measurement of *h* couplings.

Resolution of a *b*-baryon Lifetime Puzzle   2007

On CDF, I lead an analysis of $\tau(\Lambda_b)$ in exclusive decay $\Lambda_b \to J/\psi\Lambda$. At the time of publication [PRL 98 (2007) 122001], this was the single most precise measurement of $\tau(\Lambda_b)$ and higher than the previous world average by 3.2σ. Our measurement resolved the "Λ_b Lifetime Puzzle" in favor of earlier theory calculations of $\tau(\Lambda_b)$.

Resolution of the Solar Neutrino Problem   2001

On the SNO experiment, my analysis of $_8$B solar neutrino data provided first direct evidence for ν_e flavor change, resolving the decades-long "Solar Neutrino Problem". The first SNO paper [PRL 87 (2001) 71301] was based on my thesis work and lead to the 2016 Breakthrough Prize in Fundamental Physics and the 2015 Nobel Prize in Physics (A. McDonald and T. Kajita) for observation of ν_e flavor change at SNO.

PUBLICATIONS

Please find a list of publications here, including a list of my selected publications.