

MARK S. NEUBAUER

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EDUCATION

PhD	University of Pennsylvania, Physics Dissertation: <i>Evidence for Electron Neutrino Flavor Change through Measurement of the ^8B Solar Neutrino Flux at SNO</i> Advisor: Dr. Eugene Beier	2001
BS	Kutztown University, Physics Graduated <i>Summa Cum Laude</i>	1994

PROFESSIONAL APPOINTMENTS

<i>University of Illinois at Urbana-Champaign, Urbana, IL USA</i>		
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
<i>University of California at San Diego, La Jolla, CA USA</i>		
Postdoctoral Fellow	Department of Physics	2003 – 2007
<i>Massachusetts Institute of Technology, Cambridge, MA USA</i>		
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 AND LEADERSHIP

Member, Illinois Center for Advanced Studies of the Universe (Physics)	2020 –
Member, Center for Artificial Intelligence Innovation (NCSA)	2019 –
Executive Committees / Coordination Groups (current)	
Accelerated Artificial Intelligence Algorithms for Data-Driven Discovery Institute	2021 –
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 –

LEADERSHIP IN FEDERALLY FUNDED RESEARCH AWARDS (RECENT)

Research Award Leadership (selected, recent)

Co-PI	Accelerated AI Algorithms for Data-Driven Discovery Institute	2021 –
Co-PI	FAIR for Data and Artificial Intelligence Models in HEP	2020 –
PI	Illinois Tier-2 Computing Center	2019 –
Co-PI	Advancing Science with Accelerated Machine Learning	2019 –
PI	Scalable Cyberinfrastructure 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 Probe of New Physics [ATLAS, CDF experiments] 2007 –

My group is at the forefront of studying diboson production (W , Z , Higgs pairs) at colliders:

- Stringent limits on production of new particles decaying to heavy boson pairs and constraints on new physics [[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](#)]
- Two review articles on electroweak physics [[RMP 84 \(2012\) 1477](#), [ARNPS 61 \(2011\) 223](#)]

Higgs Boson Discovery and Measurement [ATLAS experiment] 2012, 2015

My group contributed to the Higgs boson h discovery [[PLB 716 \(2012\) 1](#)] in 2012 and $h \rightarrow WW^*$ observation [[PRD 92 \(2015\) 012006](#)] in 2015 through analysis of the dilepton channel. This discovery led to the [2013 Nobel Prize in Physics](#) for its theoretical prediction

Resolution of a b -baryon Lifetime Puzzle [CDF experiment] 2007

I lead an analysis measuring the Λ_b lifetime $\tau(\Lambda_b)$ in the exclusive decay $\Lambda_b \rightarrow J/\psi \Lambda^0$. 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 long-standing “ Λ_b Lifetime Puzzle” in favor of the early theory calculations of $\tau(\Lambda_b)$.

Resolution of the Solar Neutrino Problem [SNO experiment] 2001

My analysis of ^8B solar ν data provided first direct evidence for ν_e flavor change and resolved the decades-long “Solar Neutrino Problem”. The first SNO paper [[PRL 87 \(2001\) 71301](#)] was based on my thesis work and led to the [2016 Breakthrough Prize in Fundamental Physics](#) and [2015 Nobel Prize in Physics](#) (A. McDonald, T. Kajita) for observation of ν_e flavor change.

PUBLICATIONS

Please find a list of my selected publications [here](#) and a full list of my publications [here](#).