

Prof. Ed Kearns

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Professional preparation

Harvard University	Physics	Ph.D. 1990
Harvard University	Physics	A.M. 1984
Massachusetts Institute of Technology	Physics	B.S. 1982

Appointments and honors

Professor of Physics, Boston University, 2007-present
Visiting Professor, Kavli Institute for the Physics and Mathematics of the Universe,
University of Tokyo, 2008-Present (Joint Appointment)
Associate Professor of Physics, Boston University, 1999-2007
Research Assistant/Associate Professor, Boston University, 1992-1999
Research Associate, Boston University, 1990-1992

Fellow, American Physical Society
Universities Research Association (URA) Fellow, 2013
Intensity Frontier Fellow, 2013
Breakthrough Prize in Fundamental Physics, 2015

Presentations (recent and selected)

- Invited lecture and panel discussion on Nobel Prize, Stockholm U. (December 2015)
- Invited talk at Conference on Science at SURF (Rapid City, May 2015)
- Invited talk at TeVPA/DM (Amsterdam, June 2014)
- Invited talk at ICFA Regional Neutrino Meeting (Fermilab, January 2013)
- Summary talk at Lepton Baryon Violation 2011, (Gatlinburg, TN, Sep. 2011)
- Opening plenary talk at NuFACT09 (Chicago, July 2009)
- Featured speaker at Society of Physics Student Meeting (Boston, March 2009)
- Lectures: Fermilab Academic Lectures, 2014, 2013; TUNL REU Program, 2012, 2010;

Synergistic activities

- **Conference Organization:** Co-chair, Neutrino 2014, Boston; Session organizer: BLV 2015 (Amherst); Co-organizer (and Lecturer), New England Particle Physics Student Retreat 2003-2009.
- **LBNE/DUNE:** Executive Committee Member; Nucleon Decay Physics Working Group Co-Convener; Interim International Executive Board Member; Electronics Convener.
- **Super-K/Hyper-K:** Atmospheric Neutrino and Proton Decay, Electronics Working group, Co-convener; Gadolinium Committee, Member; Hyper-K International Steering Committee.
- **U.S. Particle Physics Planning:** Snowmass 2013, Baryon Number Violation Working Group Co-Convener; Neutrino Scientific Assessment Group (NuSAG), 2006-2007; Fermilab Long Range Plan Steering Group, Co-chair, Neutrino working group, 2007-08; DUSEL Program Advisory Committee, 2006.

Publications (selected)*Neutrino Oscillation*

- [1] “Establishing Atmospheric Neutrino Oscillation”,
T. Kajita, E. Kearns, M. Shiozawa, submitted to Nucl. Phys. B (2016), Special Issue on Neutrino Oscillation
- [2] “Measurements of neutrino oscillation in appearance and disappearance channels by the T2K experiment with 6.6×10^{20} protons on target”
K. Abe, *et al.* [T2K Collaboration], Phys. Rev. D91 (2015) 072010.
- [3] “Observation of Electron Neutrino Appearance in a Muon Neutrino Beam”,
K. Abe, *et al.*, Phys. Rev. Lett. 112, 061802 (2014).
Cited for Breakthrough Prize in Fundamental Physics, 2015.
- [4] “Evidence for the Appearance of Atmospheric Tau Neutrinos in Super-Kamiokande”,
K. Abe, *et al.*, Phys. Rev. Lett. 110, 181802 (2013).
- [5] “First Muon Neutrino Disappearance Study with an Off-Axis Beam”,
K. Abe, *et al.*, Phys. Rev. D 85, 031103 (2012).
- [6] “Indication of Electron-Neutrino Appearance from an Accelerator-Produced Off-Axis Beam”,
K. Abe, *et al.*, Phys. Rev. Lett. 107, 041801 (2011).
Cited for Breakthrough Prize in Fundamental Physics, 2015.
- [7] “Further study of neutrino oscillation with two detectors in Kamioka and Korea”,
F. Dufour, T. Kajita, E. Kearns, K. Okumura, Phys. Rev. D81, 093001 (2010).
- [8] “Measurement of Neutrino Oscillation by the K2K Experiment”,
M.H. Ahn, *et al.*, Phys. Rev. D 7, 072003 (2006).
- [9] “Evidence for muon neutrino oscillation in an accelerator based experiment”,
M.H. Ahn, *et al.*, Phys. Rev. Lett. 94, 081802 (2005).
Cited for Breakthrough Prize in Fundamental Physics, 2015.
- [10] “A measurement of atmospheric neutrino oscillation parameters by Super-Kamiokande I”,
Y. Ashie, *et al.*, Phys. Rev. D 71, 112005 (2005).
- [11] “Evidence for an oscillatory signature in atmospheric neutrino oscillation”,
Y. Ashie, *et al.*, Phys. Rev. Lett. 93, 101801 (2004).
- [12] “Constraints on neutrino oscillations using 1258 days of Super-Kamiokande solar neutrino data”,
Y. Ashie, *et al.*, Phys. Rev. Lett. 86, 5656 (2001).
Cited for Breakthrough Prize in Fundamental Physics, 2015
- [13] “Detecting Massive Neutrinos”,
E. Kearns, T. Kajita, and Y. Totsuka, Scientific American 281, 48 (1999).
- [14] “Evidence for oscillation of atmospheric neutrinos”,
Y. Fukuda, *et al.*, Phys. Rev. Lett. 82, 1562 (1998).
Cited for Nobel Prize in Physics, 2015; Cited for Breakthrough Prize in Fundamental Physics, 2015.

Nucleon Decay

- [15] “Search for dinucleon decay into pions at Super-Kamiokande”,
J. Gustafson *et al.*, Phys. Rev. D 91, 072009 (2015).
- [16] “Search for proton decay via $p \rightarrow \nu K^+$ using 260 kiloton year data of Super-Kamiokande”,
K. Abe *et al.*, Phys. Rev. D 90, 072005 (2014).
- [17] “Search for nucleon decay via $n \rightarrow \bar{\nu}\pi^0$ and $p \rightarrow \bar{\nu}\pi^+$ in Super-Kamiokande”,
K. Abe *et al.*, Phys. Rev. Lett. 113, 121802 (2014).
- [18] “Search for Nucleon Decay into Charged Anti-Lepton plus Meson in Super-Kamiokande I and II”,
H. Nishino *et al.*, Phys. Rev. D 85, 112001 (2012).
- [19] “Search for Proton Decay via $p \rightarrow e^+\pi^0$ and $p \rightarrow \mu^+\pi^0$ in a Large Water Cherenkov Detector”,
H. Nishino, S. Clark *et al.*, Phys. Rev. Lett. 102, 141801 (2009).
- [20] “Experimental study of the atmospheric neutrino backgrounds for $p \rightarrow e^+\pi^0$ searches in water Cherenkov detectors”,
S. Mine *et al.*, Phys. Rev. D 77, 032003 (2008).
- [21] “Search for nucleon decay via modes favored by supersymmetric grand unification models in [Super-K I]”,
K. Kobayashi, M. Earl, *et al.*, Phys. Rev. D 72, 052007 (2005).

Dark Matter

- [22] “Measurement of scintillation efficiency for nuclear recoils in liquid argon”,
D. Gastler, *et al.*, Phys. Rev. C 85, 065811 (2012).
- [23] “An Indirect Search for WIMPs in the Sun using 3109.6 days of upward-going muons in Super-Kamiokande”,
T. Tanaka, *et al.*, Astrophys. J. 742, 78 (2011).
- [24] “Scintillation time dependence and pulse shape discrimination in liquid argon”,
W.H. Lippincott, *et al.*, Phys. Rev. C 78, 039901 (2010).
- [25] “Search for dark matter WIMPs using upward through-going muons in Super-Kamiokande”,
S. Desai, *et al.*, Phys. Rev. D70, 083523 (2004)

Particle Astrophysics

- [26] “Study of TeV neutrinos with upward showering muons in Super-Kamiokande”,
S. Desai, *et al.*, Astropart.Phys.29:42-54, (2008).
- [27] “High energy neutrino astronomy using upward-going muons in Super-Kamiokande-I”,
K. Abe, *et al.*, Astrophys. J. 652, 198 (2006).
- [28] “Astrophysical Neutrino Telescopes”,
A.B.McDonald, C. Spiering, S. Schonert, E.T. Kearns, and T. Kajita, Rev. Sci. Instrum. **75**, 293 (2004).
- [29] “Final results of magnetic monopole searches with the MACRO experiment”,
M. Ambrosio, *et al.*, Eur. Phys. J. C25, 511 (2002).