

Jay Hyun Jo

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Employment

Yale University

POSTDOCTORAL ASSOCIATE

- MicroBooNE Experiment
- Advisor: Prof. Bonnie Fleming

NEW HAVEN, CT

OCT. 2018 - PRESENT

Yale University

POSTDOCTORAL ASSOCIATE

- DM-Ice and COSINE-100 Experiment
- Advisor: Prof. Reina Maruyama

NEW HAVEN, CT

DEC. 2015 - PRESENT

Stony Brook University

GRADUATE RESEARCH ASSISTANT

- T2K Experiment
- Advisor: Prof. Chang Kee Jung

STONY BROOK, NY

JUL. 2011 - DEC. 2015

Education

Stony Brook University

PH.D. IN PHYSICS

- Thesis: "Measurement of the ν_e Intrinsic Component in T2K ν_e Appearance Analysis"
- Advisor: Prof. Chang Kee Jung

STONY BROOK, NY

AUG. 2009 - AUG. 2015

Seoul National University

B.S. IN PHYSICS

- Thesis: "Effect of Ga Doping in Hexagonal HoMnO₃ Thin Film"
- Advisor: Prof. Tae Won Noh

SEOUL, SOUTH KOREA

MAR. 2003 - AUG. 2009

Professional Experience

Neutrino Oscillation Studies

OCT. 2018 - PRESENT

MICROBOONE EXPERIMENT

- Co-leading an effort in development and optimization a novel track reconstruction algorithm (Wire-Cell) for MicroBooNE liquid argon time projection chamber
- In charge of electron neutrino event selection, and low-energy excess search sensitivity study with Wire-Cell algorithm
- Served as a convener of a data production team, in charge of producing simulation and data production for various working groups

Dark Matter Searches

DEC. 2015 - PRESENT

COSINE-100 EXPERIMENT

- Led an effort to commission NaI(Tl) crystals into a crystal array in Yangyang Underground Laboratory, South Korea
- Worked on DAQ system setup as well as software framework development and data analysis
- In charge of COSINE-100 DAQ system, data production, data monitoring, and liquid scintillator system
- Led the analysis effort searching for annual modulation signal from dark matter

Dark Matter Searches

DEC. 2015 - PRESENT

DM-ICE EXPERIMENT

- Worked on the first modulation analysis publication effort
- Coordinating a team to deploy an improved dark matter detector at the South Pole

Neutrino Oscillation Studies

JUL. 2011 - DEC. 2015

T2K EXPERIMENT

- Lead analyzer of the electron neutrino charged current interaction rate on water measurement using T2K Pi-zero Detector (PØD)
- Served as a PØD expert, performed monitoring and commissioning tasks of the detector
- Served as the PØD water system expert, responsible for operating and monitoring status of the PØD water system during data taking and detector repairs

DUNE EXPERIMENT

- Assisted in DUNE 35-ton Prototype cold electronics validation, calibration, and initial installation
- Performed baseline, noise, gain measurements and data analysis in room temperature and in liquid nitrogen at BNL
- Involved in the initial installation and calibration of the board at Fermilab

Teaching Experience

Stony Brook University

STONY BROOK, NY

GRADUATE TEACHING ASSISTANT

AUG. 2009 - AUG. 2011

- Conducted weekly classical physics labs for four sections of approximately 30 students each section
- Performed test/setup/tutorials of the lab equipment, wrote lab manuals, graded lab reported and exams, proctored mid-term and final exams

Scholarships & Awards

- 2015 **Breakthrough Prize in Fundamental Physics**, T2K Experiment
- 2009 **Graduate Student Scholarship**, Stony Brook University
- 2003 **National Science Scholarship**, Korea Science and Engineering Foundation

Scientific Presentation

Invited Conferences

Recontres du Vietnam

STATUS OF THE MICROBOONE LOW-ENERGY EXCESS SEARCH

QUY NHON, VIETNAM

OCT. 2020 (POSTPONED TO 2021)

15th MultiDark Workshop

RECENT RESULTS FROM COSINE-100

ZARAGOZA, SPAIN

MAR. 2019

WIN 2017

THE STATUS OF THE COSINE-100 DARK MATTER EXPERIMENT

IRVINE, CA

JUN. 2017

IPA 2017

RESULTS OF DM-ICE17 AND THE STATUS OF COSINE-100

MADISON, WI

MAY. 2017

Berkeley Workshop on Dark Matter Detection

NAI(TL) DARK MATTER EXPERIMENT: STATUS OF EFFORT TO CONFIRM OR DENY DAMA

BERKELEY, CA

DEC. 2016

DBD 2016

STATUS OF THE COSINE-100 EXPERIMENT

OSAKA, JAPAN

NOV. 2016

Invited Seminars

Sheffield University HEP Seminar

RECENT RESULTS FROM COSINE-100

SHEFFIELD, UK

NOV. 2020 (SCHEDULED)

UChicago Dark Matter Group Seminar

COSINE-100 NAI(TL) DARK MATTER EXPERIMENT: TESTING DAMA'S CLAIM FOR A DARK MATTER DISCOVERY

CHICAGO, IL

OCT. 2020

MIT Lunchtime Seminar

COSINE-100 NAI(TL) DARK MATTER EXPERIMENT: TESTING DAMA'S CLAIM FOR A DARK MATTER DISCOVERY

CAMBRIDGE, MA

APR. 2019

SLAC Experimental Seminar

COSINE-100 NAI(TL) DARK MATTER EXPERIMENT: TESTING DAMA'S CLAIM FOR A DARK MATTER DISCOVERY

MENLO PARK, CA

MAR. 2019

Brookhaven National Laboratory Particle Physics Seminar

DM-ICE17 AND COSINE-100 NAI(TL) DARK MATTER EXPERIMENT: TESTING DAMA'S CLAIM FOR A DARK MATTER DISCOVERY

UPTON, NY

JAN. 2019

IBS CUP Seminar

RECENT RESULTS AND PROSPECTS AT T2K

DAEJEON, SOUTH KOREA

MAR. 2016

Sungkyunkwan University NAPPL Seminar

RECENT RESULTS AND PROSPECTS AT T2K

SUWON, SOUTH KOREA

MAR. 2016

Yale Wright Lab NPA SeminarMEASUREMENT OF THE INCLUSIVE CHARGED CURRENT NEUTRINO INTERACTION RATE ON WATER WITH THE T2K π^0 DETECTOR

NEW HAVEN, CT

OCT. 2015

Stony Brook Particle Physics SeminarMEASUREMENT OF THE INCLUSIVE CHARGED CURRENT NEUTRINO INTERACTION RATE ON WATER WITH THE T2K π^0 DETECTOR

STONY BROOK, NY

APR. 2015

Contributed Conferences

Neutrino2020 AN INCLUSIVE ELECTRON-NEUTRINO EVENT SELECTION FOR THE WIRE-CELL LOW-ENERGY EXCESS SEARCH IN MICROBOONE	CHICAGO, IL JUL. 2020
ICRC 2019 RESULTS OF THE DM-ICE17 AND COSINE-100	MADISON, WI JUL. 2019
APS April 2019 ANNUAL MODULATION SEARCH WITH THE COSINE-100 EXPERIMENT	DENVER, CO APR. 2019
IDM 2018 THE RECENT RESULTS FORM THE COSINE-100 EXPERIMENT	PROVIDENCE, RI JUL. 2018
APS April 2018 STATUS OF THE COSINE-100 EXPERIMENT	COLUMBUS, OH APR. 2018
ICHEP 2016 RESULTS FROM THE DM-ICE17 DARK MATTER EXPERIMENT AT THE SOUTH POLE	CHICAGO, IL AUG. 2016
IDM 2016 RECENT RESULTS FROM DM-ICE17	SHEFFIELD, UK JUL. 2016
NNN 2015 MEASUREMENT OF THE CHARGED CURRENT NEUTRINO INTERACTION RATE ON WATER WITH THE T2K P10 DETECTOR	STONY BROOK, NY OCT. 2015
DPF 2015 MEASUREMENT OF THE CHARGED CURRENT NEUTRINO INTERACTION RATE ON WATER WITH THE T2K P10 DETECTOR	ANN ARBOR, MI AUG. 2015
Lake Louise Winter Institute NEUTRINO CROSS SECTION AND INTERACTION RATE MEASUREMENTS INVOLVING CHARGED CURRENT ν_e AND NEUTRAL CURRENT π^0 WITH THE T2K NEAR DETECTOR	LAKE LOUISE, CANADA FEB. 2015
APS April Meeting 2013 MEASUREMENT OF THE HIGH ENERGY ν_e IN THE T2K BEAM USING ND280 PoD	ANN ARBOR, MI APR. 2013
Neutrino2012 MEASUREMENT OF THE ν_e COMPONENT OF T2K'S ν_μ BEAM WITH ND280 PoD	KYOTO, JAPAN JUN. 2012

Publication List

- [1] P. Abratenko et al. Neutrino Event Selection in the MicroBooNE Liquid Argon Time Projection Chamber using Wire-Cell 3-D Imaging, Clustering, and Charge-Light Matching. *arXiv:2010.01375*, 2020.
- [2] P. Abratenko et al. A Convolutional Neural Network for Multiple Particle Identification in the MicroBooNE Liquid Argon Time Projection Chamber. *arXiv:2010.08653*, 2020.
- [3] P. Abratenko et al. Measurement of Differential Cross Sections for ν_μ -Ar Charged-Current Interactions with Protons and no Pions in the Final State with the MicroBooNE Detector. *arXiv:2010.02390*, 2020.
- [4] P. Abratenko et al. The Continuous Readout Stream of the MicroBooNE Liquid Argon Time Projection Chamber for Detection of Supernova Burst Neutrinos. *arXiv:2008.13761*, 2020.
- [5] P. Abratenko et al. Measurement of Space Charge Effects in the MicroBooNE LArTPC Using Cosmic Muons. *arXiv:2008.09765*, 2020.
- [6] C. Adams et al. A Method to Determine the Electric Field of Liquid Argon Time Projection Chambers Using a UV Laser System and its Application in MicroBooNE. *JINST*, 15:P07010, 2020.
- [7] G. Adhikari et al. Lowering the energy threshold in COSINE-100 dark matter searched. *arXiv:2005.13784*, 2020.
- [8] H. Prihtiadi et al. Measurement of the cosmic muon annual and diurnal flux variation with the COSINE-100 detector. *arXiv:2005.13672*, 2020.
- [9] G. Adhikari et al. The COSINE-100 Liquid Scintillator Veto System. *arXiv:2004.03463*, 2020. **Lead author, significant contributions.**
- [10] P. Abratenko et al. Vertex-Finding and Reconstruction of Contained Two-track Neutrino Events in the MicroBooNE Detector. *arXiv:2002.09375*, 2020.

- [11] P. Abratenko et al. Search for heavy neutral leptons decaying into muon-pion pairs in the MicroBooNE detector. *Phys. Rev. D*, 101:052001, 2019.
- [12] C. Adams et al. Reconstruction and Measurement of O(100) MeV Energy Electromagnetic Activity from $\pi^0 \rightarrow \gamma\gamma$ Decays in the MicroBooNE LArTPC. *JINST*, 15:P02007, 2019.
- [13] C. Adams et al. Calibration of the Charge and Energy Response of the MicroBooNE Liquid Argon Time Projection Chamber using Muons and Protons. *JINST*, 15:P03022, 2019.
- [14] Y.J. Ko et al. Comparison between DAMA/LIBRA and COSINE-100 in the light of quenching factors. *JCAP*, 11:008, 2019.
- [15] E. Barbosa de Souza et al. Study of cosmogenic radionuclides in the COSINE-100 NaI(Tl) detectors. *Astropart. Phys*, 115:102390, 2019.
- [16] P. Adhikari et al. A search for solar axion induced signals with COSINE-100. *Astropart. Phys*, 114:101, 2019.
- [17] G. Adhikari et al. COSINE-100 and DAMA/LIBRA-phase2 in WIMP effective models. *JCAP*, 06:048, 2019.
- [18] G. Adhikari et al. Search for a dark matter-induced annual modulation signal in NaI(Tl) with the COSINE-100 experiment. *Phys. Rev. Lett.*, 123:031302, 2019. **Lead author, significant contributions.**
- [19] C. Ha et al. First Direct Search for Inelastic Boosted Dark Matter with COSINE-100. *Phys. Rev. Lett.*, 122:131802, 2019.
- [20] G. Adhikari et al. An experiment to search for dark-matter interactions using sodium iodide detectors. *Nature*, 564:83–86, 2018. **Significant contributions.**
- [21] G. Adhikari et al. The COSINE-100 data acquisition system. *JINST*, 13:P09006, 2018. **Lead author, significant contributions.**
- [22] P. Adhikari et al. Background model for the NaI(Tl) crystals in COSINE-100. *Eur.Phys.J.C*, 78:490, 2018.
- [23] H. Prihitiadi et al. Muon detector for the COSINE-100 experiment. *JINST*, 13:T02007, 2018.
- [24] K. Abe et al. Measurement of the single π^0 production rate in neutral current neutrino interactions on water. *Phys.Rev.D*, 97:032002, 2018.
- [25] G. Adhikari et al. Initial performance of the COSINE-100 experiment. *Eur.Phys.J.C*, 78:107, 2018. **Significant contributions.**
- [26] K. Abe et al. Search for Lorentz and CPT violation using sidereal time dependence of neutrino flavor transitions over a short baseline. *Phys.Rev.D*, 95:111101, 2017.
- [27] K. Abe et al. First measurement of the muon neutrino charged current single pion production cross section on water with the T2K near detector. *Phys.Rev.D*, 95:012010, 2017.
- [28] K. Abe et al. Measurement of Coherent π^+ Production in Low Energy Neutrino-Carbon Scattering. *Phys.Rev.Lett.*, 117:192501, 2016.
- [29] K. Abe et al. Measurement of double-differential muon neutrino charged-current interactions on C_8H_8 without pions in the final state using the T2K off-axis beam. *Phys.Rev.D*, 93:112012, 2016.
- [30] K. Abe et al. Measurement of Muon Antineutrino Oscillations with an Accelerator-Produced Off-Axis Beam. *Phys.Rev.Lett.*, 116:181801, 2016.
- [31] K. Abe et al. Measurement of the muon neutrino inclusive charged-current cross section in the energy range of 1–3 GeV with the T2K INGRID detector. *Phys.Rev.D*, 93:072002, 2016.
- [32] E. Barbosa de Souza et al. First Search for a Dark Matter Annual Modulation Signal with NaI(Tl) in the Southern Hemisphere by DM-Ice17. *Phys.Rev.D*, 95:032006, 2016.
- [33] K. Abe et al. Upper bound on neutrino mass based on T2K neutrino timing measurements. *Phys.Rev.D*, 93:012006, 2016.
- [34] K. Abe et al. Measurement of the Electron Neutrino Charged-current Interaction Rate on Water with the T2K ND280 pi-zero Detector. *Phys.Rev.D*, 91:112010, 2015. **Lead author, significant contributions.**

- [35] K. Abe et al. Measurement of the ν_μ charged current quasi-elastic cross-section on carbon with the T2K on-axis neutrino beam. *Phys.Rev.D.*, 91:112002, 2015.
- [36] K. Abe et al. Measurements of neutrino oscillation in appearance and disappearance channels by the T2K experiment with $6.6E20$ protons on target. *Phys.Rev.D.*, 91:072010, 2015.
- [37] K. Abe et al. Measurement of the ν_μ CCQE cross section on carbon with the ND280 detector at T2K. *Phys.Rev.D.*, 92:112003, 2015.
- [38] K. Abe et al. Search for short baseline ν_e disappearance with the T2K near detector. *Phys.Rev.D.*, 91:051102, 2014.
- [39] K. Abe et al. Neutrino Oscillation Physics Potential of the T2K Experiment. *Prog.Theor.Exp.Phys*, 4:043C01, 2014.
- [40] K. Abe et al. Measurement of the Inclusive Electron Neutrino Charged Current Cross Section on Carbon with the T2K Near Detector. *Phys.Rev.Lett.*, 113:241903, 2014.
- [41] K. Abe et al. Measurement of the inclusive ν_μ charged current cross section on iron and hydrocarbon in the T2K on-axis neutrino beam. *Phys.Rev.D.*, 90:052010, 2014.
- [42] K. Abe et al. Measurement of the neutrino-oxygen neutral-current interaction cross section by observing nuclear deexcitation γ rays. *Phys.Rev.D.*, 90:072012, 2014.
- [43] K. Abe et al. Measurement of the intrinsic electron neutrino component in the T2K neutrino beam with the ND280 detector. *Phys.Rev.D.*, 89:092003, 2014.
- [44] K. Abe et al. Precise Measurement of the Neutrino Mixing Parameter θ_{23} from Muon Neutrino Disappearance in an Off-axis Beam. *Phys.Rev.Lett.*, 112:181801, 2014.
- [45] K. Abe et al. Observation of Electron Neutrino Appearance in a Muon Neutrino Beam. *Phys.Rev.Lett.*, 112:061802, 2014.
- [46] K. Abe et al. Measurement of Neutrino Oscillation Parameters from Muon Neutrino Disappearance with an Off-axis Beam. *Phys.Rev.Lett.*, 111:211803, 2013.
- [47] K. Abe et al. Evidence of Electron Neutrino Appearance in a Muon Neutrino Beam. *Phys.Rev.D.*, 88:032002, 2013.
- [48] K. Abe et al. Measurement of the Inclusive NuMu Charged Current Cross Section on Carbon in the Near Detector of the T2K Experiment. *Phys.Rev.D.*, 87:092003, 2013.
- [49] K. Abe et al. The T2K Neutrino Flux Prediction. *Phys.Rev.D.*, 87:012001, 2013.
- [50] J. H. Jo et al. Effects of electrode polarity on filament ruptures during unipolar resistance switching. *Curr. Appl. Phys*, 10:817–820, 2010. **Lead author, significant contributions.**

Service & Outreach

Yale Physics Olympics

VOLUNTEER

NEW HAVEN, CT

OCT. 2019 - PRESENT

Yale Girl's Science Investigation

VOLUNTEER

NEW HAVEN, CT

SEP. 2019 - PRESENT

Wright Lab NPA Seminar

ORGANIZER

NEW HAVEN, CT

JAN. 2016 - AUG. 2017

Skills

Programming Languages	C++, Python, MATHEMATICA, Bash Shell Scription
Platform	UNIX, Linux, macOS, Microsoft Windows
Tools	ROOT, git, cvs, \LaTeX
Languages	Korean, English

References

Bonnie Fleming

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