Dr. Joseph K Han

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EDUCATION

Texas A&M University, College Station, Texas
Doctor of Philosophy in Nuclear Physics, May 2016
Dissertation: *Jet fragmentation via recombination of parton showers and its medium modification in heavy ion collisions*

Yonsei University, Seoul, South Korea
Master of Science in High Energy Physics, February 2008
Thesis: *Search for $B^+ \to K^- l^+ l^+$ decays at BELLE*

Yonsei University, Seoul, South Korea
Bachelor of Science in Physics, February 2006

Research Interests

- **Laser Physics:** how to amplify attosecond X-ray laser pulses in a plasma medium modulated by IR/optical lasers, how to get induced transparency of X-ray laser pulses, etc
- **Nuclear Physics:** how to probe quark-gluon plasma, how to describe the formation of hadrons from partons, medium effects in hadronization, etc

(Details are shown in my research experience and my publication below)

TEACHING EXPERIENCE

- **Prairie View A&M University, Prairie View, Texas**
  Lecturer I September 2023 - present
  Adjunct Instructor January 2023 – May 2023
  PHYS2325 (Calculus-based Physics 1) courses
  PHYS2125 and PHYS1101 Labs
- **Lone Star College, Tomball, Texas**
  Adjunct Professor August 2019 – present
  Fall, Summer, and Spring from 2019 - present
  PHYS 2425 (Calculus-based Physics1: Mechanics, Wave, and Thermodynamics) -Using **Pearson Mastering Physics**
  PHYS 1410 (Elementary Physics) – Using **McGraw-Hill Connects**
  PHYS 1401 and PHYS 1402 (College Physics) **– Using Pearson Mastering Physics**
  PHYS 2426 (Calculus-based Physics: Electromagnetism, Optics, and Modern Physics)
  Write syllabi and instruct both lecture and lab classes in both courses – Using **Pearson Mastering Physics**
  After the new normal due to the COVID-19, started instructing theory by teaching via WebEx video lecture and **D2L LMS** platform and virtual labs via PhET simulation and Labster in spring, summer, fall 2020, and spring 2021.

- **Liberty University, Lynchburg, Virginia**
  Adjunct Professor January 2022 - present
  Summer D 2022, Fall B and C 2022
  PHYS 101 (Elements of Physics)- Facilitate the online courses in **Canvas** and **WebAssign**

PHYS 103 (Elements of Physics Lab) – Facilitate the online lab class.

- **Hartwell University, Dallas, Texas**
  Adjunct Professor January 2022 - present
  Spring 2022
  Facilitates **College Algebra** and **Introduction to Physics** online in **Canvas**
  For the Introduction to Physics course, gives online live lectures of lectures and instructs virtual labs with **PhET simulators**.
  Uses **McGraw-Hill Connect** for homework assignments and quizzes.

- **San Jacinto College-North Campus, Houston, Texas**
  Adjunct Professor January 2021 – October 2021
  Spring 2021
  University Physics I (PHYS2325/PHYS2125)
  University Physics II (PHYS2326/PHYS2126)
  Wrote syllabi and used **Blackboard LMS** to instruct lectures and labs for University Physics I and University Physics II classes.
- **Ecclesia College, Springdale, Arkansas**
  Adjunct Professor January 2019 - present
  Spring, Summer, and Fall 2019 and Spring and Summer 2020
  MATH-1345
  Facilitating an online course of Applied College Math: Algebra by using the **CANVAS** platform
  Opened a new physics course: Introduction to Physics (PHYS 1405), built the course, and instructed both theory and lab for this course in Fall 2021
- **University of Mary Hardin-Baylor, Belton, Texas**
  Adjunct Professor August 2016 - present
  Fall 2016
  PHYS 2411L1, PHYS2411L2, PHYS2421L1, and PHYS2421L2
  Taught lab sections in algebraic-based and calculus-based physics classes.
- **Lone Star College, Creekside Center, Texas**
  Adjunct Professor June 2016 - present
  Summer I, II 2016
  Physics 2426: Calculus-based Physics: Electricity, Magnetism, and Light
  Wrote syllabi and instructed physics lectures and lab classes.
- **Texas A&M University, College Station, Texas**
  Teaching Assistant (PHYS 218: Calculus-based Physics: Mechanics) Spring 2016
  Teaching Assistant (PHYS 208: Calculus-based Physics: Electricity and Optics) Spring 2010 – Fall 2010
  Instructed undergraduate students in physics lab classes, taught undergraduate students in physics recitation classes, and graded homework and examinations.
  Grader (PHYS 625: Statistical Mechanics for graduate students) Fall 2009
  Graded statistical mechanics homework.
- **Sejong University, Seoul, Korea** March 2009 – July 2009
  Lab Assistant
  Instructed undergraduate students in physics lab class and graded their lab reports
- **Yonsei University, Seoul, Korea**
  Teaching Assistant (Calculus-based University Physics I, II) Spring, Fall 2006
  Instructed physics lab and recitation classes for undergraduate students and graded their homework and examinations
  Teaching Assistant (Electrodynamics I, II for Physics Junior Students) Spring, Fall 2007
  Instructed recitation classes on Electrodynamics for junior students and graded their homework and examinations

Undergraduate Teaching Assistant March 2005 – August 2005
Instructed recitation class on algebraic-based physics for science and engineering students

RESEARCH EXPERIENCE

- **Institute for Quantum Science and Engineering (IQSE), Texas A&M University, College Station, Texas**
  Visiting Scholar February 2020 – Present
  Exploring the amplification of a train of attosecond X-ray laser pulses in a plasma medium

  Postdoctoral Research Associate September 2016 – May 2019
  - Studied the amplification of sub-femtosecond X-ray pulses in a plasma medium with a modulated resonant transition by IR/optical lasers
  - Built a Linux-based calculation server in a supercomputer for IQSE and managed it.

- **Cyclotron Institute, Texas A&M University,** College Station, Texas
  Research Assistant September 2010 – January 2016
  - Applied a quark coalescence model of parton showers and the Monte Carlo method with a FORTRAN program to study hadron production of jets produced in heavy ion collisions and medium modification of jet fragmentation.
  - Developed a FORTRAN-based program module that can generate momenta and positions of hadrons converted from partons produced in heavy ion collisions.
  - Used relativistic viscous hydrodynamics with the FORTRAN program to study viscous effects in dilepton production and quarkonia production in relativistic heavy ion collisions

- **KEK,** Tsukuba, Japan
  Visiting Researcher March 2006 – February 2008
  Used the BELLE Analysis Framework based on C++, ROOT, GEANT4, and Shell Scripting in the Linux system to study decay modes that cause lepton flavor violation at BELLE, Japan, and stayed in Tsukuba, Japan for four months per year under collaboration with researchers from various countries

- **Yonsei University,** Seoul, Korea
  Research Assistant March 2006 – February 2008
  - Used software such as C++, ROOT, GEANT4, and Shell Scripting to study decay modes that cause lepton flavor violation at BELLE.
  Undergraduate Research Assistant June 2004 – February 2006
  - Used perturbative QCD to study J/ψ suppression in perturbative QCD and used **FORTRAN** to calculate the dissociation rate of J/ψ.

HONORS AND AWARDS

• 5 Years of Service Special Recognition, Lone Star College, Texas		April 2022
• Scholarship from National Unification Advisory Council, Dallas, TX,	$2 K	September 2015
• Texas A&M University Travel award, TX	$1 K	June 2014
• DOE travel award, US	$1 K	June 2013
• Rev. Oak Hanheum Scholarship, SaRang Community Church, Korea,	$24 K	January 2011 – December 2013
• Scholarship from Korean American Scholarship Foundation, US,	$1 K	August 2010
• Scholarship from YBM, Korea	$2 K	2009-2010
• Scholarship from North Korean Refugees Foundation, Korea,	$11.5 K	October 2009 – October 2010

- Brain Korea 21 Fellowship, Yonsei University, Korea, $18.6 K March 2006 - February 2008
- Scholarship for Minority Students, Yonsei University, Korea, $20.18K March 2006 - December 2008
- Patriot Scholarship, Yonsei University, Korea, $13.35K March 2004 – December 2005
- Chunil Scholarship, Korea, $1 K February 2005
- Excellence Award, Hanawon, Ministry of Unification, Korea $2 K January 2003

COMPUTER SKILLS

- Programming Languages: FORTRAN, C, C++, Python, SQL, Perl, and Shell Scripting (bash, tcsh, csh, ...)
- Operating Systems: Linux, Windows, and DOS
- Parallel Computing: OpenMP, CUDA, and MPI
- Graphic and Computing Tools: OriginLab, GENAT4, Mathematica, MatLab , ROOT, PAW, Gnuplot, R, and Adobe Photoshop
- Editing Software: Emacs, LaTex, HTML, Microsoft Office

LEADERSHIP & ACTIVITIES

- The US Chapter President of the North Korean Human Rights Union, January 2022 - present
- Faculty, Hartwell Quest (Hartwell, LLC), December 2020 – present
- Advisory Board Member, Youth With A Mission, Tyler, Texas, January 2019 - present
- Faculty Advisor, Student Activity: Liberty in North Korea (LiNK), Texas A&M University, March 2018 – May 2019
- Volunteer, Clay Pigeon Sporting Event for fundraising for Big Brothers Big Sisters of the Brazos Valley, Snook, Texas, May 5, 2018
- Member, American Physical Society, February 2010 - present
- Volunteer, Habitat in Humanity, 2016 and 2019
- Volunteer, Physics Festivals at Texas A&M University, College Station, Aprils of 2010, 2016, and 2017

JOURNAL REFEREES

- Physical Review A
- Physical Review C
- Physical Review D

PUBLICATIONS & PROCEEDINGS

1. "Temporal and spectral control of the X-ray pulses in a resonant medium with a modulated transition frequency." Vagizov, F., Antonov, V., Khairulin, I., Radeonychev, Y., **Han, K. C.**, & Kocharovskaya, O. (2021, July). In International Conference on X-Ray Lasers 2020 (Vol. 11886, p. 118860I). International Society for Optics and Photonics.

2. "Shaping of X-ray Pulses via Dynamical Control of Their Interaction with a Resonant Medium" T Akhmedzhanov, V Antonov, X Zhang, **K. C. Han**, E Kuznetsova, I Khairulin, Y Radeonychev, M Scully, O Kocharovskaya, **Springer Proceedings** in Physics, 2020, 241, pp. 45-52

3. "Amplification of a train of attosecond pulses in a plasma-based X-ray laser driven by an IR field" V. A. Antonov, **K. C. Han**, IR Khairulin, O Kocharovskaya, **J. Phys. Conf. Ser.** 1412, 072019

(2020)

4. "Attosecond Pulse Amplification in a Plasma-Based X-Ray Laser Dressed by an Infrared Laser Field"
V. A. Antonov, **K. C. Han**, T. R. Akhmedzhanov, M. O. Scully, and Olga Kocharovskaya
Phys. Rev. Lett. **123**, 243903 (2019)

5. "Sub-fs x-ray plasma-based lasers driven by an IR field",
Olga Kocharovskaya, **Kyong-Chol Han**, and Ilias Khairulin,
X-Ray Lasers and Coherent X-Ray Development and Applications XIII, 2019

6. "Towards sub-fs x-ray plasma-based lasers"
KC Han, VA Antonov, IR Khairulin, TR Akhmedzanov, MO Scully, O Kocharovskaya,
Physics of Quantum Electronics-2019

7. "Amplification of a train of attosecond pulses in active medium of a plasma-based x-ray laser dressed by an optical laser field"
T. R. Akhmedzhanov, V. A. Antonov, **K. C. Han**, and Olga Kocharovskaya, 231-231.
10.1109/LO.2018.8435575. 2018 International Conference Laser Optics (ICLO)

8. " Dynamical control of the resonant interaction: Towards quantum x-ray optics and novel X-ray sources"
T. R. Akhmedzhanov, V. A. Antonov, X. Zhang, **K. C. Han**, E. Kuznetsova, I. R. Khairulin, Y. V. Radeonychev, O Kocharovskaya, MODERN PROBLEMS OF LASER PHYSICS, 2018

9. "Jet Hadronization via Recombination of Parton Showers in Vacuum and in Medium"
R. J. Fries, **K. Han**, and C. M. Ko, **Nucl. Phys. A** 956 (2016) 601-604

10. "Jet Fragmentation via Recombination of Parton Showers"
K. C. Han, R. J. Fries, and C. M. Ko, **Phys. Rev., C** 93 (2016), 045207

11. "Jet Hadronization via Recombination of Parton Showers in Vacuum and in Medium"
R. J. Fries, **K. Han,** and C. M. Ko, Nuclear Physics Proceedings 276, 297-300 (2015)

12. "Quarkonia production in heavy ion collisions"
C. M. Ko, **K. Han,** and T. Song. **Nucl. Phys. A** 910-911, 474 (2013).

13. "Event-by-event bottomonia suppression in relativistic heavy-ion collisions"
T. Song, **K. C. Han,** and C. M. Ko. **J. Phys. Conf. Ser**. 420, 012023 (2013).

14. "Quarkonia production in relativistic heavy ion collisions"
C. M. Ko, **K. Han** and T. Song. **J. Phys. Conf. Ser.** 422, 012006 (2013).

15. "Effects of initial fluctuations on bottomonia suppression in relativistic heavy-ion collisions"
T. Song, **K. C. Han,** and C. M. Ko. **Nucl. Phys. A** 897, 141 (2013).

16. "Jet Fragmentation via Recombination of Parton Showers"
K. C. Han, R. J. Fries, and C. M. Ko. **J. Phys. Conf. Ser**. 420, 012044 (2013)

17. "Charmonium production from nonequilibrium charm and anticharm quarks in quark-gluon plasma"
T. Song**, K. C. Han** and C. M. Ko. **Phys. Rev. C** 85, 054905 (2012)

18. "Bottomonia suppression in heavy-ion collisions"
T. Song, **K. C. Han** and C. M. Ko. **Phys. Rev. C** 85, 014902 (2012)

19. "Charmonium production in relativistic heavy-ion collisions"
    T. Song, **K. C. Han** and C. M. Ko. **Phys. Rev. C** 84, 034907 (2011)

20. "Dilepton production in a schematic causal viscous hydrodynamics"
    T. Song, **K. C. Han** and C. M. Ko. **Phys. Rev. C** 83, 024904 (2011)

Total number of citations: 294 times by Google Scholar, 233 times by inSpireHep, 242 times by Rese archGate, 195 times by Scopus (h-index: 7)
For a detailed publication list go to
https://scholar.google.com/citations?user=5HLPF7EAAAAJ&hl=en&oi=ao
http://inspirehep.net/search?ln=en&ln=en&p=find+ea+han%2C+kyong+chol+or+han%2C+kyon gchol&of=hcs&action_search=Search&sf=&so=d&rm=&rg=25&sc=0
https://www.researchgate.net/profile/Kyong_Chol_Han
https://www.scopus.com/authid/detail.uri?authorId=37009530900

ORAL PRESENTATION

- *Amplification of a Train of Attosecond High-Harmonic X-Ray Pulses by Plasma-Based X-Ray Lasers in "Water Window",*
  Physics Colloquium, Yonsei University, Seoul, South Korea, Monday, July 3, 2023
- *Amplification of Attosecond High-Harmonic X-Ray Pulses by Plasma-Based X-Ray Lasers: towards intense attosecond sources for fast dynamical imaging in a "water window"*
  Physics Department Colloquium, Kyung Hee University, Seoul, South Korea, Friday, June 16, 2023
- *Attosecond Pulse Amplification in a plasma-based X-Ray Laser Dressed by an Optical Laser Field,*
  TAMU-PQE Follow-on Workshop, College Station, Texas, Wednesday, January 16, 2019
- *Amplification of a train of attosecond X-ray pulses in an active plasma medium dressed by an IR laser field,* Workshop on Emerging Frontiers in Quantum-, Nano-, and Bio- Photonics, College Station, Texas, Tuesday, September 12, 2018
- *Amplification of a train of attosecond pulses in an active medium of a plasma-based X-ray laser modulated by an IR laser field,* TAMU-Princeton-Baylor Joint Seminar on Quantum Science and Engineering, Casper, Wyoming, Friday, Jul 27, 2018
- *CARS (Coherent Anti-Stokes Raman Spectroscopy),* Friday, Nov 3, 2017, Baylor University
- *FWM (four-wave mixing) and FAST CARS*, Nov 17, 2017, Baylor University
- *The Heitler-London Method for the Hydrogen Molecule*, Dec 15, 2017, Texas A&M University
- *Jet Fragmentation via Recombination of Parton Showers in Vacuum*
  Invited Talk in Department of Physics, April, 7th, 2015, Trinity University, San Antonio, Texas
- *Medium Modification of Jet Fragmentation at RHIC and LHC*
  JET Collaboration Meeting, June 10-14, 2013, Ohio State University, Columbus, Ohio

- *Medium Modification of Jet Fragmentation*

  Cyclotron Institute Colloquium, April 2013, Texas A&M University, College Station, Texas

References for Joseph (Kyong Chol) Han:

Paul Snyder
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Ecclesia College
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(He is my supervisor at Ecclesia College)

Olga Kocharovskaya
Distinguished Professor
IQSE and Department of Physics,
Texas A&M University
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(She was my supervisor at IQSE)

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(He is the director of IQSE)

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(He was my supervisor at Lone Star College, Creekside Center)

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(He was my supervisor when I was a TA at Yonsei University)