

CURRICULUM VITAE

Personal Information

Heeseung Zoe (조희승)¹
Assistant Professor
Department of Physics
Izmir Institute of Technology



Research & Teaching Interests

Theoretical Physics about the Origin of the Universe
Quantum Information and Machine Learning
Interdisciplinary Education and Research
Innovative Teaching Based on Students Engagement

Education

- March 2003 - February 2009
Ph.D. in Physics
Korea Advanced Institute of Science and Technology (KAIST)
Daejeon, South Korea
- March 2001 - February 2003
M.S. in Physics
Korea Advanced Institute of Science and Technology (KAIST)
Daejeon, South Korea
- March 1996 - February 2001
B.S. in Physics (Minor in Mathematics)
Korea Advanced Institute of Science and Technology (KAIST)
Daejeon, South Korea

¹My name on the passport is Heesueng Cho.

Career

- August 2020 – July 2021
Researcher
Department of Physics Education
Pusan National University
Busan, South Korea.
- September 2020 – June 2021
Visiting Scholar
Department of Physics Engineering
Istanbul Technical University
Istanbul, Turkey.
- March 2015 – August 2020
Visiting Professor
School of Undergraduate Studies
College of Transdisciplinary Studies
DGIST, Daegu, South Korea.
 - Massive Open Online Course (MOOC) in Korean
 - * Historical Approach to Quantum Physics (2019) [\[link\]](#)
 - Developing Interdisciplinary Courses
 - * Art and Physics - Physical Principles in Design and Music (2019)
 - * Differential Equation with Classical Mechanics (2019)
 - * Vector Calculus with Electromagnetism (2019)
 - Teaching
 - * Seminar for Transdisciplinary Studies (2019)
 - * Introduction to Particle Cosmology (2019)
 - * Classical Mechanics (2015 - 2020)
 - * Classical Mechanics Lab (2015 - 2018, 2020)
 - * Electromagnetism (2015 - 2019)
 - * Electromagnetism Lab (2015 - 2019)
 - * Mathematical Physics (2016 - 2017)
 - Undergraduate Group Research Programs (UGRP)
 - * Quantum Field Theory in Curved Spacetime (2019)
 - * The Possibility and Stability of Our Universe (2018)
 - * From Inflation to Structure Formation (2017)
 - * Modelling of Black Hole Evaporation (2016)
 - * Surgical Auto-sealing Device (2016)
 - Outreach Research & Education (R & E) Projects
 - * Introduction to Quantum Mechanics (2019)

- * Gravitational Waves Trapped in Space (2019)
- * Simple Modelling of Gravitational Waves (2019)
- * Gravitational Waves and Global Positioning System (2018)
- * Applications of Sommerfeld's Quantization (2017)
- * Structure of Universe in General Relativity (2016)
- * Theory of relativity and Global Positioning System (2015)
- Services
 - * Committee of Center for Teaching and Learning (2016 - 2019)
 - * Committee of Freshmen Global Leadership Program (2017 - 2019)
- June 2012 – February 2015
 Assistant Instructor
 (1) Division of General Studies
 (2) Center for Teaching & Learning
 UNIST, Ulsan, South Korea.
 - Course Redesign Project for University Physics based on the Flipped Learning.
 - Teaching around 400 students in English in every semester.
- November 2011 – May 2012
Postdoctoral Researcher
 Department of Physics
 KAIST, Daejeon, South Korea
 (Advisor: Ewan D. Stewart)
- September 2010 – August 2011
Postdoctoral Researcher
 Department of Physics
 Middle East Technical University (ODTÜ), Ankara, Turkey
 (Advisor: Bayram Tekin)
- April 2009 – May 2010
Postdoctoral Researcher
 Department of Physics
 Izmir Institute of Technology (İYTE), Izmir, Turkey
 (Advisor: Recai Erdem)

Publications

- Research Publications in Theoretical Physics (HEP) ²
 1. Bae, Hong, and **Zoe**
Modeling Cosmological Perturbations of Thermal Inflation
e-Print: 2204.08657 [astro-ph.CO]
submitted to JCAP.
 2. Bae, Ben-dayan, Schiffer, Yun and **Zoe**
Trapped Gravitational Waves in Jackiw-Teitelboim Gravity
e-Print: 2002.11651 [gr-qc]
Universe, 7 (2), 40 (2021).
 3. **Zoe**
Observable Small-scale Effects of Thermal Inflation
e-Print: 2002.05386 [astro-ph.CO]
Proceedings of NDM 2020.
 4. Bae, Lee, Yeom and **Zoe**
Before the Page time: maximum entanglements or the return of the monster?
e-Print: 2002.03543 [hep-th]
Submitted to Symmetry.
 5. Bae, Yeom and **Zoe**
Demonstration of the Hayden-Preskill protocol via mutual information
J. Korean Phys. Soc. 75, 941 (2019).
 6. Hwang, Park, Yeom and **Zoe**
How can we erase states inside the black hole ?
J. Korean Phys. Soc. 73, 1420 (2018) (Highlighted).
 7. Bae, Bae, Choe, Lee, Lim and **Zoe**
CMB Spectral Distortions from Multi-stage Inflation
Phys. Lett. B782, 117 (2018).
 8. Hong, **Zoe**, Ahn, Cho, and Stewart
Small-scale Features of Thermal Inflation
Phys. Rev. D96, 103515 (2017).
 9. Hong, **Zoe** and Ahn
Effects of Thermal Inflation on 21 cm Power Spectrum
The Bulletin of the Korean astronomical society, 42(2), 78-79 (2017).
 10. Cho, Hong, Stewart, and **Zoe**
CMB Spectral Distortions Constraints on Thermal Inflation
JCAP 1708, 002 (2017).
 11. Hwang, Lee, Nho, Park, Oh, Yeom and **Zoe**
Page Curves for Tripartite Systems
Class.& Quant. Grav. 34, 145004 (2017).

²The authors are alphabetically ordered in most of the following research publications.

12. Hong, Lee, Lee, Stewart and **Zoe**
Effects of Thermal Inflation on Small Scale Curvature Perturbation
JCAP 1506 (2015) 06, 002
13. Yeom and **Zoe**
Can the Horowitz-Maldacena Proposal be an Alternative to the Firewall?
J. Korean Phys. Soc. 63, 1109 (2013)
14. Hwang, Lee, Stewart, Yeom and **Zoe**
Euclidean Quantum Gravity and Stochastic Inflation
Phys. Rev. D 87, 063502 (2013)
15. Hong, Stewart and **Zoe**
Anthropic Likelihood for the Cosmological Constant and the Primordial Density Perturbation Amplitude
Phys. Rev. D 85, 083510 (2012)
16. Hong, Lee and **Zoe**
The Possibility of Inflation in Asymptotically Safe Gravity
Int. J. Mod. Phys. D21, 1250062 (2012)
17. Yeom and **Zoe**
Semi-classical Black Holes with Large N Re-scaling and Information Loss Problem
Int. J. Mod. Phys. A26, 3287 (2011)
18. Yeom, Hong and **Zoe**
Critical Reviews on Holographic Measure over the Multiverse
Int. J. Mod. Phys. Conf. Ser. 1, 317 (2011)
19. Hong, Hwang, Yeom and **Zoe**
Black Hole Complementarity with Local Horizons and Horowitz-Maldacena's Proposal
JHEP 0812, 080 (2008)
20. Yeom and **Zoe**
Constructing a Counterexample to the Black Hole Complementarity
Phys. Rev. D 78, 104008 (2008)

- Physics Education Publications (PER)
 1. **Zoe**, Hwang, Moon, and Lee
Cooperativeness, Conceptual Understanding and Self-Efficacy in Cooperative Electromagnetism Classes
submitted to European Journal of Physics.
 2. **Zoe**, Kwak, Yeom and Lee
Students' satisfaction and performance in flipped physics classrooms having different proportions of face-to-face lecturing
New Phys.: Sae Mulli 71, 78 (2021).
 3. **Zoe**, Kwak, Cho, Seo, Choi, Beum, Im and Lee
The Role of Face-to-face Lecturing in Flipped Classrooms
[arXiv:1404.3566 [physics.ed-ph]][[link](#)]
- Engineering Publications (ENG)
 1. Park, Oh and **Zoe**
Dynamic Analysis of Reaction Force sensing Series Elastic Actuator as Unlumped Two Mass System
IECON 2016 - 42nd Annual Conference on IEEE Industrial Electronics Society
- Books
 1. Lee, Park, Choe and **Zoe**
Workbook of Electrodynamics (Korean), DGIST Press, (2015)
 2. **Zoe** and Choe
Mathematical Physics (Korean), E-text book, DGIST Press, (2016)