Hyejin Kim

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aadeliee22

SUMMARY

Highly motivated PhD student trained in physics, mathematics, and computor science (machine learning, numerical computation) with 2 year of research experience.

Research interest: **Condensed matter physics theory (CMT)** , both theoretical and numerical.

- Strongly correlated quantum many-body system / Phase transition / Non-equilibrium quantum dynamics
- Topological phase/order

EDUCATION

Aug. 2022 – pres. **Cornell University** *NY, USA*
Physics PhD student

Mar. 2018 – Aug. 2022 **Gwangju Institute of Science & Technology (GIST)** *Gwangju, S. Korea*
B.S. Physics major, Mathematics minor
- Thesis: Variational Autoencoder for the metal-insulator transition in DMFT
- Magma Cum Laude. (GPA: 4.19/4.5, Major GPA: 4.47/4.5)

Jul. – Aug. 2019 **Boston University** *MA, USA*
- Summer 2 session, GPA: 4.0/4.0

PUBLICATIONS & PRESENTATIONS

Journal Articles [*Submitted*] **H. Kim**, D. Kim, D.-H. Kim (2022). Minimal neural network to learn the metal-insulator transition in the dynamical mean-field theory, *NPSM*

Conferences [*Online presentation*] **H. Kim**, D. Kim, D.-H. Kim (2021). Interpretation of a minimal neural network to learn the metal-insulator transition in the dynamical mean-field theory, In *2021 Korean Physical Society Conference in Gwangju-Chonnam Branch*

RESEARCH EXPERIENCE

Jul. 2020 – pres. **Computational Many-body Physics Group, GIST** *Gwangju, S. Korea*
Undergraduate Research Intern (Advisor: Prof. Dong-Hee Kim)

Feb. 2022 – pres.
- **Variational Autoencoder for the metal-insulator transition in the dynamical mean-field theory**
  ...

Dec. 2020 – Jan. 2022
- **Interpretation of a minimal neural network to learn the metal-insulator transition in the dynamical mean-field theory**
  ··· Interpretation on the network connectivity trained by the hybridization function (DMFT-NRG). Discussed the relationship between phase indicator and the quasiparticle weight.

Jul.– Aug. 2020
- **Machine-learning accelerated Monte-Carlo algorithm for 2D spin model**
  ··· Implementation of Self-learning Monte Carlo method with nontrivial model.

Dec. 2019 – Mar. 2020 **Quantum Field & Gravity Theory Group, GIST** *Gwangju, S.Korea*

Undergraduate Research Intern (Advisor: Prof. Keun-Young Kim)

- **Implementation of AdS/DL correspondence**
  - ··· Predicted bulk metric of holographic model of strongly correlated models.

AWARDS & HONORS

2020 – pres. **National Scholarship for Science & Engineering,** Korea Student Aid Foundation, full fund

2018 – 2019 **Korea Government Scholarship,** GIST

2018 – 2020 **Academic Scholarship to excellence,** GIST

Jul. 2019 **Scholarship for Summer session abroad,** GIST, full fund

Jan. 2017 **Encouragement Award,** Korean Young Physicists' Tournament (KYPT)

TEACHING EXPERIENCE

Gwangju Institute of Science and Technology *Gwangju, S. Korea*

Spring 2020 / Spring 2021
- Teaching assistant
  - ··· General Physics & Rec. I: Lectured recitation class. Scoring homeworks, midterm & final exams.

Fall 2021
- Teaching assistant
  - ··· General Physics & Rec. I: Lectured recitation class in English. Scoring homeworks.

RELEVANT COURSE PROJECT

Physics

Nov. 2021 ○ Nuclear & particle physics: Report & Presentation on 'Renormalization group with SFT, QFT approach'

Nov. 2020 ○ Thermal & statistical physics: Presentation on 'Quantum Ising model'

Apr. 2020 ○ Quantum physics I: Report on 'Exact solution of finite harmonic oscillator'

Jan. 2019 ○ Physical Biology of the Cell: Project on bacterial growth rate from microscopy data, gene expression and the effect of repressor

Mathematics

Jun. 2020 ○ Abstract Algebra: Report for geometric constructions

Others

Jun. 2021 ○ Machine Learning & Deep Learning: Project for implementing neural network classifier on CIFAR100.

SKILLS

Programming Languages
- Working knowledge of: Python, C/C++, PyTorch, Linux server (Linux Shell Script), LaTeX
- Familiar with: git, Cmake, Mathematica, TensorFlow2
- Library: TRIQS (NRG ljubljana solver), trng4 (random number generator), fftw

Languages
- Korean (native), American English (advanced), German (basic)

Hyejin Kim | GIST, S. Korea | **aadeliee@gm.gist.ac.kr**

EXTRA CURRICULAR ACTIVITIES

Attended programs

Jul. 2021 ◦ KISTI N-Ways to GPU Programming Bootcamp

Aug. 2020 ◦ SLAC summer institute: Exploring the Weakly Coupled Universe

Club activities

◦ Physics club HOLICS

2019 – 2020 · · · President of the club

2019 · · · Physics & Math seminar, half hour Presentation: mathematical analysis of Coanda effect.

2018 – 2020 · · · Physics study group: Classical dynamics, Quantum mechanics

2019 ◦ Cooking club volunteer for school events

2018 – pres. ◦ Piano & Badminton club activities

Extra activities

Nov. 2021 ◦ Played piano for cousin's wedding

Mar. 2019 ◦ GIST newspaper article: Review for course 'Physical Biology of the Cell', gistnews.co.kr/?p=3807

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