Hyejin Kim

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Department of Physics and Photon Science, GIST, Republic of Korea

RESEARCH INTEREST

Condensed matter theory;
Strongly correlated systems, Topological phase/insulator
Computational Many-body physics
Implementation of Machine learning; Neural networks

EDUCATION

Gwangju Institute of Science & Technology (GIST) *Mar. 2018 – present*
B.S. Physics major, Mathematics minor
- GPA: 4.21/4.5 (3.86/4.0)
- Major GPA: 4.47/4.5 (4.0/4.0)

Boston University, Boston, MA *Jul. – Aug. 2019*
Summer session
- GPA: 4.0/4.0 (Statistics & Probability, Micro-economic Analysis)

Caltech-GIST collaboration course *Jan. 2019*
Physical Biology of the Cell, Instructor: prof. Rob Phillips

RESEARCH EXPERIENCE

Computational Many-body Physics Group, GIST *Jul. 2020 – present*
Undergraduate Research Intern
(Advisor: prof. Dong-Hee Kim)

- **Machine-learning prediction of Mott transition on DMFT**
  - ··· DMFT-NRG & DMFT-ED calculation on Hubbard model.
  - ··· Analyzed the features of the neural network, trained by the hybridization function.
  - ··· Extracted order parameter that can be employed both in the real & Matsubara frequency solver.
- **Machine-learning accelerated Monte-Carlo algorithm for 2D spin model**
  - ··· Analyzed the classical Ising model; Markov chain Monte-Carlo & autocorrelation, finite size scaling.
  - ··· Implementation of Self-learning Monte Carlo method with nontrivial model; Plaquette Ising model.

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

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

- Implemented deep neural network in AdS/CFT, to predict bult metrix of holographic model of strongly correlated models.

AWARDS & HONORS

National Graduate Science & Technology Scholarship *2020 – present*
Korea Student Aid Foundation(KOSAF), full fund

Korea Government Scholarship, GIST *2018 – 2019*

Academic Scholarship to excellence, GIST *2018 – 2020*

Scholarship for Summer session abroad *Jun.–Aug. 2019*
GIST, full fund

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

TEACHING EXPERIENCE

Teaching assistant *Spring 2020 & Spring 2021*

- General Physics & Rec. I
  - ··· Lectured in recitation section. Scoring homeworks, midterm & final exams.

SKILLS

Programming languages

- Working knowledfe of: Python, C/C++, PyTorch, Linux Shell Script(Linux server), LaTeX
- Familiar with: git, Mathmatica
- Library: TRIQS (DMFT-NRG ljubljana solver), trng4 (random number generator), fftw

Languages
Korean (native), American English (fluent)

RELEVANT COURSEWORK

Physics

··· Mandatory: Classical Mechanics I/II, Electromagnetism I/II, Mathematical Methods of Physics I/II, Quantum Physics I/II, Thermodynamics & Statistical Mechanics, Experimental Physics I

··· Relevant: Solid State Physics, Advanced Statistical Physics, Computational Physics

··· Additional: Physical Biology of the Cell, Astrophysics, General Relativity

Mathematics

· · · Calculus I/II, Linear Algebra, Differential equations, Statistics & Probability, Complex Analysis, Geometry, Abstract Algebra, Discrete Mathematics

Others

· · · Machine Learning & Deep Learning, Microeconomy

EXTRA CURRICULAR ACTIVITY

Physics club HOLICS

- President of the club *2019–2020*
- Physics & Math seminar: *2019*
  half hour presentation about mathematical analysis of Coanda effect.
- Physics study group: Classical dynamics, Quantum mechanics *2018–2020*

Extra activities

- GIST newspaper temporal column: *Mar. 2019*
  Review for course 'Physical Biology of the Cell'
- Cooking club volunteer for school events *2019*
- Piano & Badminton club activities *2018–present*
- Drawing pictures: instagram.com/spiral2236 *2019–present*