

Junyeop Kim

Curriculum Vitae

Personal Informations

Citizenship : Republic of Korea

Born : November 21st, 2001 in Seoul, Republic of Korea

Address : 132, Magokseo 1-ro, Gangseo-gu, Seoul, Republic of Korea (postal : 07598)

Email : f4june777@konkuk.ac.kr

Website : <https://junyeop.github.io/>

Languages : native in Korean, fluent in English

Education

BSc in Physics and Mathematics
Konkuk University, Seoul

(Mar. 2020 ~ Feb. 2025)

GPA : 4.29 / 4.50 (major : physics 4.39, mathematics 4.25) (1st best out of 130 students)

Thesis : Path-integral approach to Bose-Einstein condensation (ongoing project)

Advised by *Junhyun Yeo*

Research Interests

- Mathematical generalisations of quantum field theory : topological and algebraic QFT
- Categorical approaches to topological spaces
- Applications of quantum field theory to condensed matters, especially quantum phase transitions

Awards and Honors

- **Merit-based scholarship** (2020 ~ 2023)
Konkuk University, 7 times
- **Dean's List** (2020 ~ 2023)
Konkuk University, 5 times
- **Bronze Medal, 40th University Students Contests of Mathematics** (Jan. 2022)
Korean Mathematical Society

Outreach

- **Mentorship** (2022 ~ 2023)
 - Mentorship programs of department of physics
 - : As a mentor student, gave lectures on selected topics of mathematical physics.
(Fourier series and transform, ordinary and partial differential equations, complex analysis)
- **Essays** posted on my personal website (2023 ~ 2024)
 - The method of steepest descent and asymptotic forms of Airy function
 - ~~Weierstrass factorization theorem~~
 - ~~Monte-Carlo simulation and its application to 2-dim Ising model~~
 - ~~Tight-binding approximation~~
 - Hypergeometric differential equation
 - Integral representation of Bessel function
 - ~~Path-integral Monte-Carlo and its application to the harmonic oscillator~~
 - ~~Grassmann variable~~
 - ~~Why are second-countable Hausdorff spaces important?~~

- **Presentation**

- Solid State Physics I class
: 20 minutes presentation about tight binding approximation

(May. 2023)

- **Volunteer Activities**

- ~~N hours at OO institute~~
: ~~teach OO for OO~~

~~(Nov. 2024)~~

- ~~M hours at PP institute~~
: ~~teach PP for PP~~

~~(Oct. 2024)~~

Undergraduate Internship Program

- **Computational Many-Body Physics Group**
(GIST, Gwangju Institute of Science and Technology)

(Jan. 2024)

Advised by *Donghee Kim*

- Learnt Variational and Path Integral Monte-Carlo techniques.
- Wrote a Fortran program for which calculates diagonal elements of a density operator of harmonic oscillators applying PIMC technique.
- Reviewed papers which adumbrate the way to get the excitation spectrum of liquid ^4He , so called phonon-maxon-roton spectrum, applying VMC and shadow wave function method.

Skills

- Fortran, Python, LaTeX, Matlab