

# Junyeop Kim

## Curriculum Vitae

### Personal Informations

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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

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**BSc in Physics and Mathematics**

(Mar. 2020 ~ Feb. 2025)

**Konkuk University, Seoul**

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

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- 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

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- **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

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- **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  
: 20 minutes presentation about tight binding approximation

(*May. 2023*)

- **Volunteer Activities**

- N hours at OO institute  
: teach OO for OO
- M hours at PP institute  
: teach PP for PP

(*Nov. 2024*)

(*Oct. 2024*)

## Undergraduate Internship Program

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- **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  $^4\text{He}$ , so called phonon-maxon-roton spectrum, applying VMC and shadow wave function method.

## Skills

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- Fortran, Python, LaTeX, Matlab