JUNGHYEON PARK

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EDUCATION

KAIST Daejeon, South Korea
PhD in Physics 2018–2024

KAIST Daejeon, South Korea
BS in Physics (Advanced Major) 2014–2018

WORK EXPERIENCE

Vacuum Seoul, South Korea
Quant Trader July 2024 – Present

- **End-to-end system ownership** Served as the sole engineer for an algorithmic trading system on a major crypto exchange, implementing FIX-based message handler, internal message republisher, market making logic, order-management module, and data persistence. Collaborated directly with the exchange's engineers on connectivity, authentication, and order-handling rules. (C++, OnixS)
- **Market data** Built and operated ETL pipelines for redundant collection of direct exchange feeds and third-party vendor data, producing standardized datasets. Worked directly with vendors to debug feed specifications and data quality issues. (Rust, Serde JSON, MayStreet Bellport, Polars)
- **System operation** Owned deployment and runtime operation of the live trading system in an environment with private connectivity to the venue, involving process supervision, logging/metrics, and CLI/Slack-based monitoring and alerting for system health and risk exposure. (Linux, shell)
- **Simulation** Designed and implemented an MBP simulation engine in Rust, integrated as a Polars plugin and maintained as my primary backtesting and analysis tool. (Rust, Python, Polars)
- **Trading strategy research** Researched market-making and other trading strategies using global market data, performing exploratory analysis to understand market behaviour, designing input features, and conducting P&L analysis to assess strategy performance. (Polars, PyTorch)

RESEARCH EXPERIENCE

KAIST August 2020 – August 2024

- **Collider phenomenology**: Contributed to the validation of cross-section calculation and software development, leading to the publicated results on anomalous triple gauge couplings' implications.
- **Machine learning application**: Applied deep neural network, boosted decision trees techniques in the collider data analysis, suggesting them as optimized statistical analysis strategies.
- **Axion cosmic strings**: Utilized an in-house developed framework for supercomputing simulations to study the dynamics of cosmic strings and their implications for axion dark matter.
- **High-performance computing**: Deployed large-scale lattice simulation codes using Open MPI to run on the Nurion high-performance computing system at National Supercomputing Center.

KAIST October 2018 – July 2020

- **Cosmology**: Worked under Prof. Ewan D. Stewart, focusing on the field dynamics in cosmology with supersymmetry.
- **GPU acceleration**: Developed a GPU-accelerated CUDA code for field simulation.

KAIST/IBS-CAPP July 2017 – January 2018

Worked on the undergraduate thesis titled "Software Engineering Approach to DAQ for Microwave Cavity Axion Search" under Prof. Yannis K. Semertzidis.

PUBLICATIONS

- Heejoo Kim, Junghyeon Park, Minho Son, "Axion Dark Matter from Cosmic String Network", Journal of High Energy Physics, vol. 07, no. 150, 2024.
- Haeyun Hwang, Ui Min, Junghyeon Park, Minho Son, Jae Hyeok Yoo, "Anomalous triple gauge couplings in electroweak dilepton tails at the LHC and interference resurrection", Journal of High Energy Physics, vol. 08, no. 069, 2023.

MILLITARY SERVICE

Technical Research Personnel
KAIST, Republic of Korea 2020–2023

SKILLS

- **Programming Languages** C, C++, Python, Rust, Wolfram
- **ML Frameworks** PyTorch, TensorFlow, ROOT TMVA
- **Open-source Contributions** FeynCalc, Visual Studio Code, HEPML-LivingReview, AMReX, VTK, dust (du in Rust)

LANGUAGES

- Native in Korean.
- Proficient in English. (980/990 on the TOEIC on March 16, 2024)
- Working knowledge of Japanese. (AL on the OPIc on March 31, 2024)