Quantum Information Science Club Association

SungBin Lee

President, QISCA

QISCA

QUANTUM INFORMATION CLUB AT KOREA UNIVERSITY · QUANTUM INFORMATION CLUB AT KOREA UNIVERSITY · UICK

SNU QUANTUM RESEARCH TEAM

EQS Entangled Qubits Society

QIYA

What is QISCA ?

■ Quantum Information Science Club Association

Founded in **October 2024**, motivated by the **Quantum Coalition** in USA

Association of student clubs in the fields of quantum computing

Website: https://koreaquantumsociety.github.io/QISCA2024.github.io/index.html#main1

YouTube: https://www.youtube.com/channel/UCIEL2P4rE2ZiaeeN5kTiaLw

LinkedIn: https://www.linkedin.com/company/qisca-quantum-information-science-club-association

Email: koreaquantumclubs@gmail.com

■ Member clubs (Feb. 2025, 200 students)

QUICK (Korea U.)

SQRT (SNU)

EQS (KAIST)

QIYA (Yonsei U.)

We are looking for motivated student clubs interested in quantum computing!

Please contact SungBin Lee (rqtoe@snu.ac.kr) or official email (koreaquantumclubs@gmail.com) if you are interested!

QISCA Website

Quantum Information Science Club Association

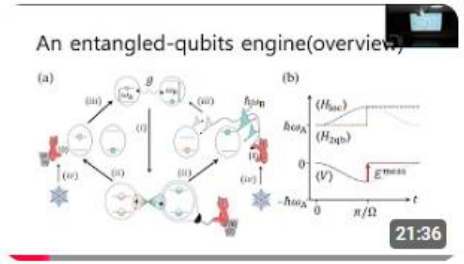
@QuantumInformationScienceClubA · 18 subscribers · 14 videos

We are Quantum Information Science Club Association (QISCA) in South Korea. ...more

Customize channel | Manage videos

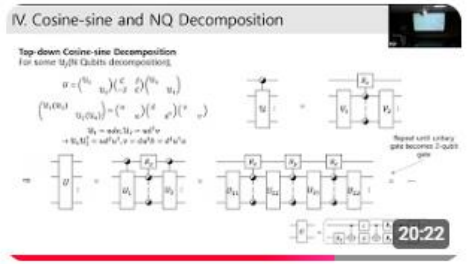
Videos | Playlists | Posts

Latest | Popular | Oldest



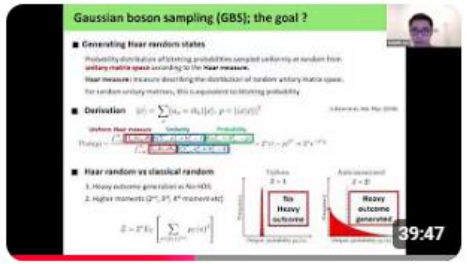
[QISCAJS] 250203(B) Two-Qubit Engine Fueled by Entanglement & Local...

7 views • 8 days ago



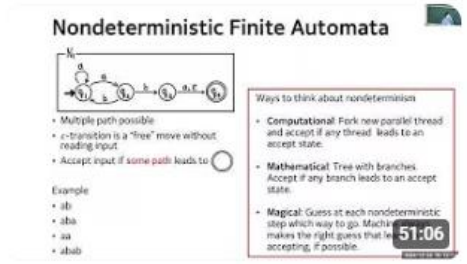
[QISCA Joint Seminar] 250203(A) Various Methods of Quantum Gate Decomposition...

10 views • 8 days ago



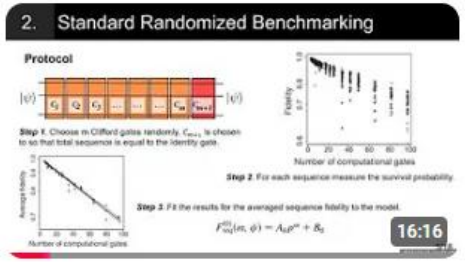
[QISCA Joint Seminar] 250120 Quantum computational advantage & Boson samplin...

7 views • 4 weeks ago



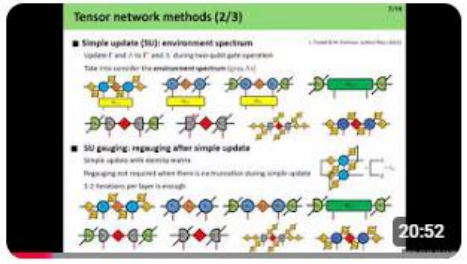
QISCA 2024 Winter Meeting - QUICK - Complete problems of quantum complexity...

6 views • 1 month ago



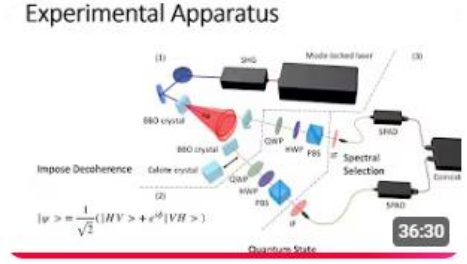
QISCA 2024 Winter Meeting - SQRT - Developing scalable benchmarking protoco...

9 views • 1 month ago



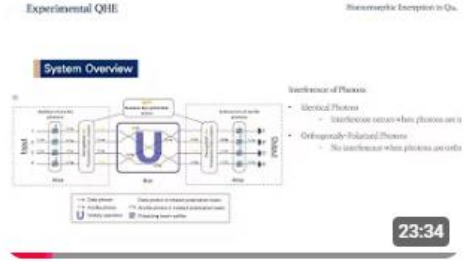
QISCA 2024 Winter Meeting - SQRT - Random Quantum Circuits by Sungbin Lee

8 views • 1 month ago



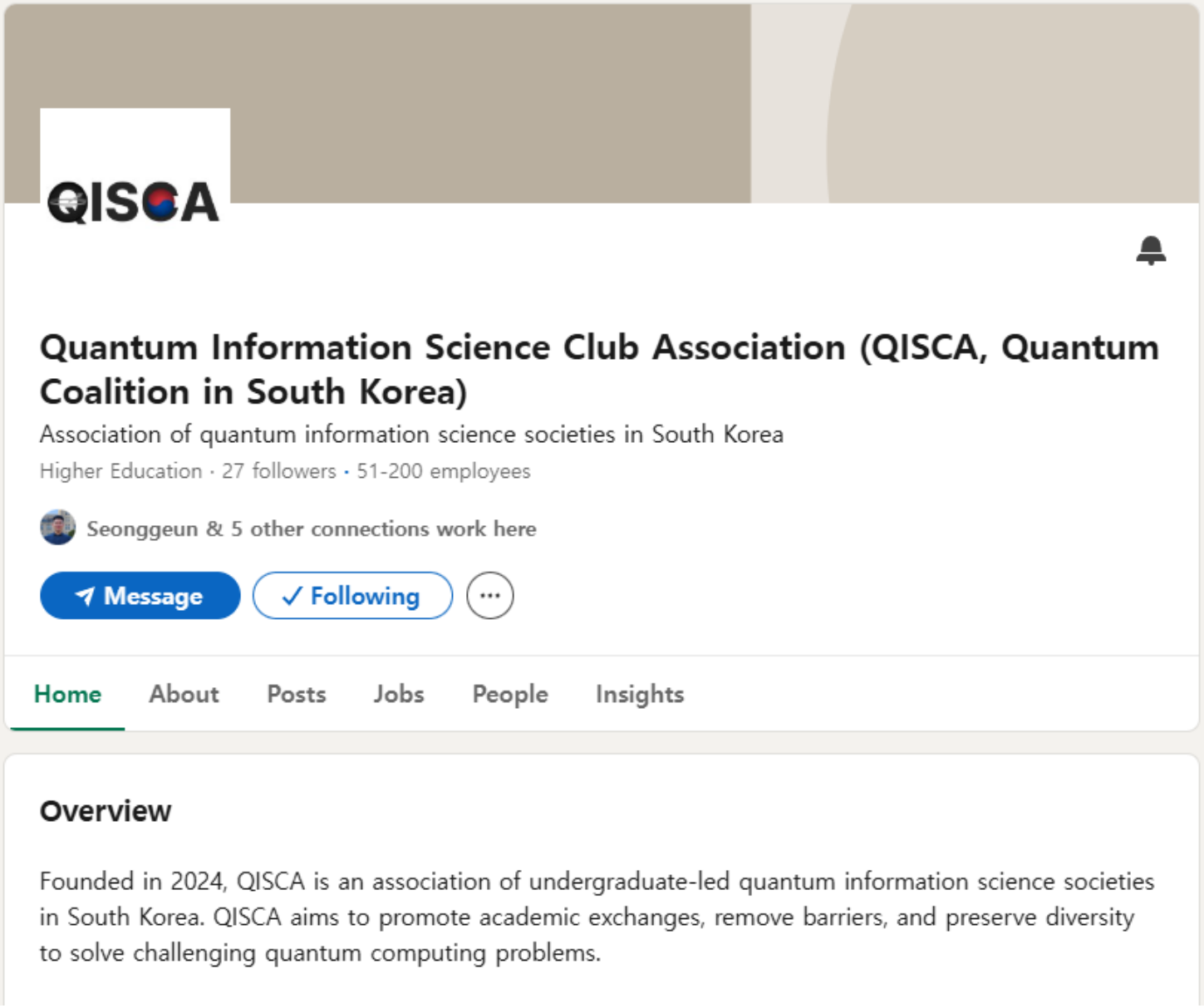
[QISCA Joint Seminar] 250113 Entanglement in Linear Optics by Wonseok Huh(EQS)

10 views • 1 month ago



[QISCA Joint Seminar] 250106 Homomorphic Encryption in Quantum...

17 views • 1 month ago


QISCA
Quantum Information Science Club Association (QISCA, Quantum Coalition in South Korea)
Association of quantum information science societies in South Korea
Higher Education · 27 followers · 51-200 employees
Seonggeun & 5 other connections work here
Message
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Overview
Founded in 2024, QISCA is an association of undergraduate-led quantum information science societies in South Korea. QISCA aims to promote academic exchanges, remove barriers, and preserve diversity to solve challenging quantum computing problems.

QISCA Discord + KakaoTalk Group Chat

Korea Quantum Clubs

Events
Browse Channels
Members

rules
announcement
moderator-only

TEXT CHANNELS
general
journal-club
board-members
off-topic
newsletter
irregular-activities
systems
journal-club-tf
academics
newsletter-tf
summer-winter-meeting...
outreach

VOICE CHANNELS
General

announcement Follow

Welcome to #announcement!

This is the start of the #announcement channel.

Edit Channel

January 24, 2025

koreaquantumclubs 1/24/2025 8:38 PM
This is the official discord channel of QISCA, the quantum coalition in South Korea.
https://koreaquantumsociety.github.io/QISCA2024.github.io/
https://www.youtube.com/channel/UCIEL2P4rE2ZiaeeN5kTiaLw

YouTube
Quantum Information Science Club Association
We are Quantum Information Science Club Association (QISCA) in South Korea.
We have four memebers now
- EQS from KAIST (https://sites.google.com/view/eqs-kaist)
- QUICK from Korea University (https://quick.oopy.io/)
- SQRT from Seoul National University (https://sites.google.com/view/sqrt-quantum)
- QIYA from Yonsei University (https://qiya-yo...

January 31, 2025

koreaquantumclubs 1/31/2025 2:12 AM
This is the announcement of <2025 SNU-UChicago-UTokyo: Quantum International Collaborative Research Worksho

The Quantum Research Group of the Seoul National University Advanced Research Promotion Center plans to host
Collaborative Research Workshop> to promote international cooperation in the field of quantum science and techno
We are planning to invite professors from the University of Chicago and the University of Tokyo to be a meaningful ev
fields, so we ask for your interest and participation.

1. Date: 2025. 2. 4. (Tue.) – 2. 5. (Wed.) [2 days and 1 night]
2. Time
3. February 4th (Tuesday) 9:00-18:30
4. February 5th (Wednesday) 9:00-15:25
5. Location: Seoul National University Building 28 (College of Natural Sciences Large Lecture Building) Room 101

QISCA 전국양자정보과학동아리연합회
191

● 공지 필독! (2024/11/06 최신화)●
...

회원 여러분, 안녕하세요. 연합회 초대 회장 이성빈입니다. 서울대학교 물리천문학부 20학번으로 현재 3학년 재학중에 있습니다.

2024년 10월 30일 결성된 전국양자정보동아리 연합회는 양자정보분야 학술 교류 활성화 및 글로벌 인재 육성을 목적으로 설립되었습니다. 목표 달성을 위해 매주 월요일 공동논문세미나를 진행하고 있으며 12월부터 4개 학교가 모두 연사로 참가하여 진행할 예정입니다. 현재 2025년 1-2월 연사 모집 중에 있으며 자세한 모집 내용은 각 학교 대표님들께 문의드리면 되겠습니다.

논문세미나 외에도 양자정보이론, Surface code, 초전도 양자회로, 중성원자 시뮬레이터 등을 주제로 스터디 운영을 추진하고 있으며, 기초스터디 또한 4개 학교 통합하여 운영할 계획을 가지고 있습니다. 또한, 학기 동안 스터디, 논문세미나, 인턴십, 그리고 프로젝트에 참가하며 공부한 내용을 공유하기 위해 매 학기 기말고사 종료 후 공동 연구 발표회를 대면으로 개최할 예정이며, 202
...
전체보기

2 13 2

강현구 (KAIST EQS)
이번 겨울에 KAIST에서 KAIST-MIT 양자 정보 겨울학교를 진행합니다. 좋은 기회이니 한 번 확인해보시면 좋을 것 같습니다.

21:19
6 3 1 1

QISCA Leadership (Spring 2025)

President: SungBin Lee
Senior, Dept. of Physics and Astronomy, SNU

+82 10-9650-0718
rqtoe@snu.ac.kr
https://www.linkedin.com/in/sungbin-lee-1a2534191/

Vice President: Seonggeun Park
Senior, Dept. of Electrical Engineering, Korea U.

+82 10-8748-9605
ssgg0926@korea.ac.kr
https://www.linkedin.com/in/goseumdochy/

JuHyun Song

Sungheum Yoo

Yoonjin Bae

Daniel D. Ohm

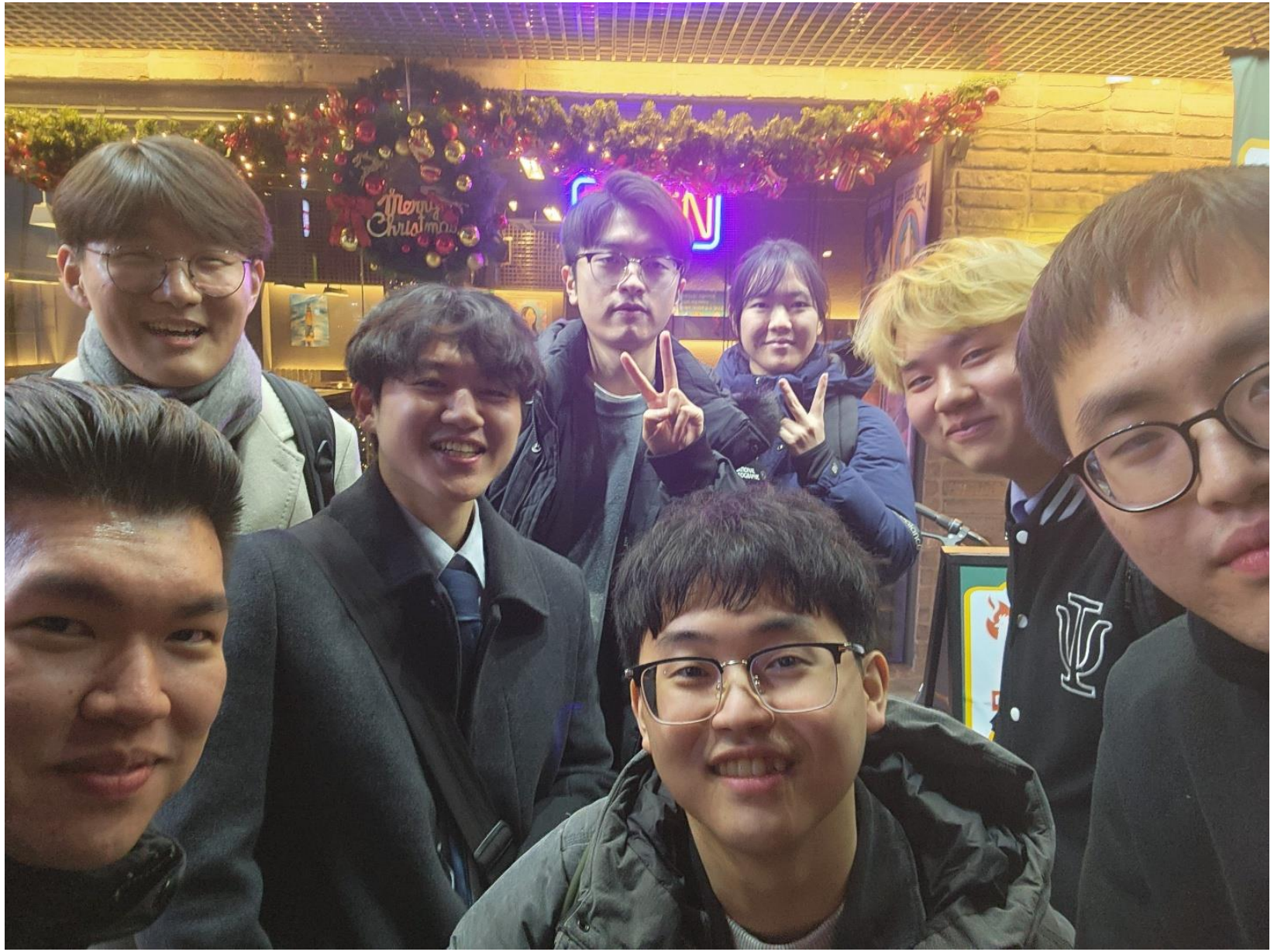
Hyeongmin Lim

Seokwon Choi

Jeongwoo Lee

JongYeon Lee

Leadership (Fall 2024)



Activities: Basic

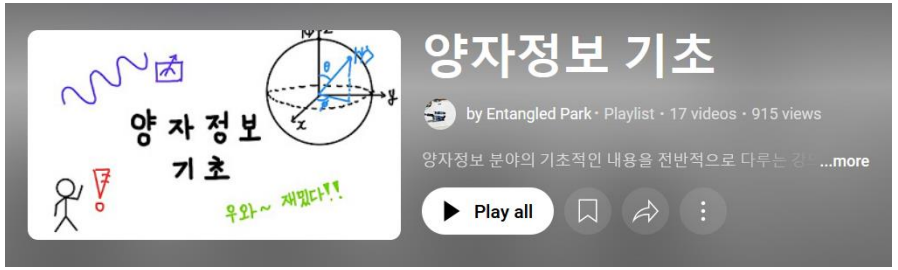
■ Basic Quantum Information Theory Study (BQIT)

Study for those learning quantum information for the first time

Matrix, Qubits, Quantum circuits, Deutsch-Jozsa algorithm, Grover's algorithm, Density operator, Quantum error correctiom etc

https://www.youtube.com/playlist?list=PLROMN5J9m7qt35oJ4X2RFylLcSaHB64lT

Developed by Seonggeun Park at Korea U.



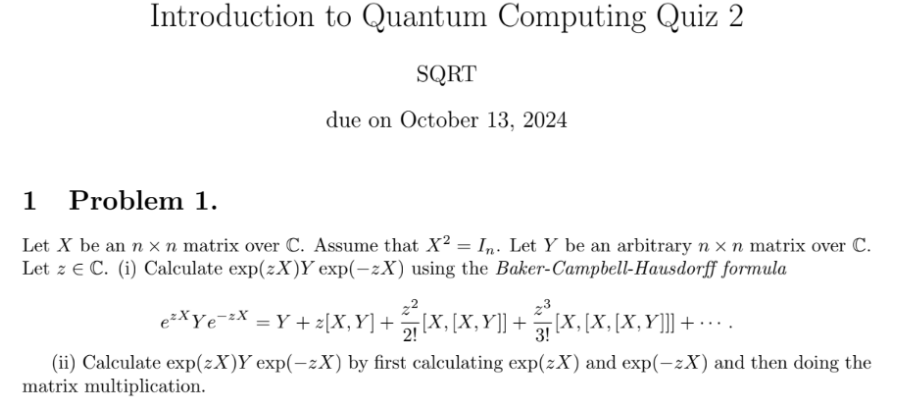
■ Basic Quantum Mechanics Study (BQM)

Study for those learning quantum mechanics for the first time

Postulates, Schrodinger equation, Phase space, Hermitian operator, Simple Harmonic Oscillator, Ladder operator, Rabi Oscillation, Density operator, open quantum system, etc

https://ocw.mit.edu/courses/8-04-quantum-physics-i-spring-2016/pages/video-lectures/part-1/

Using MIT OpenCourseWare Quantum Physics



Introduction to Quantum Computing Quiz 2

SQRT

due on October 13, 2024

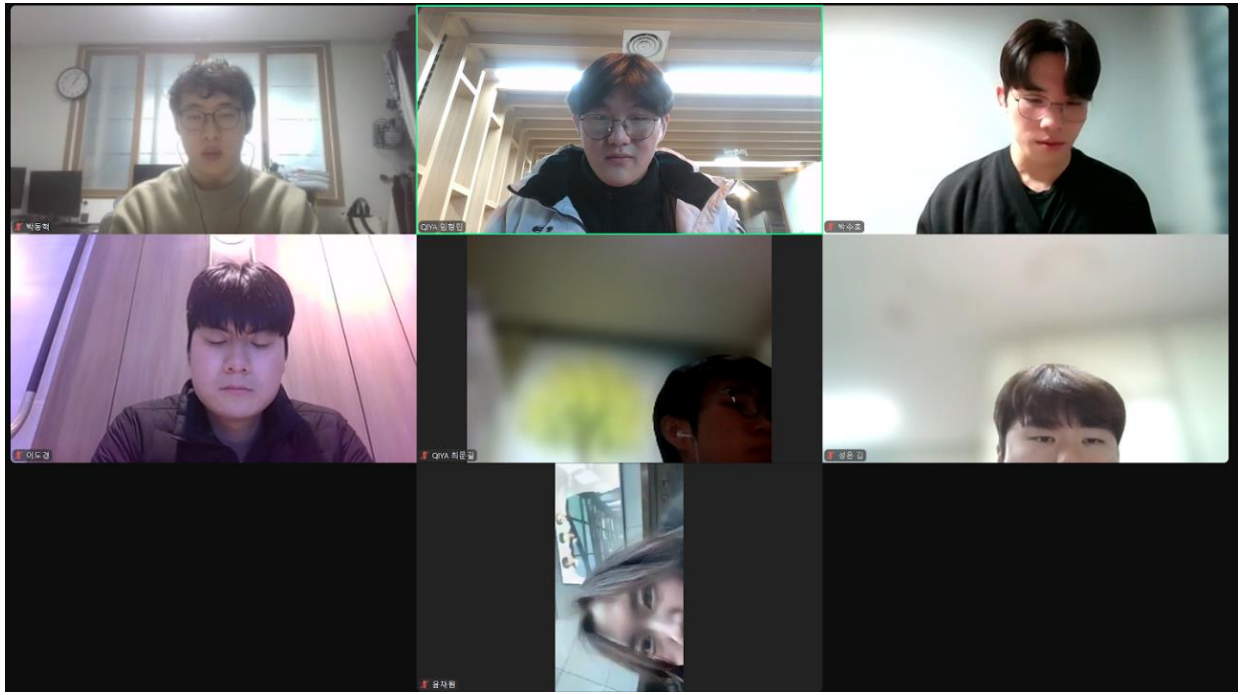
1 Problem 1.

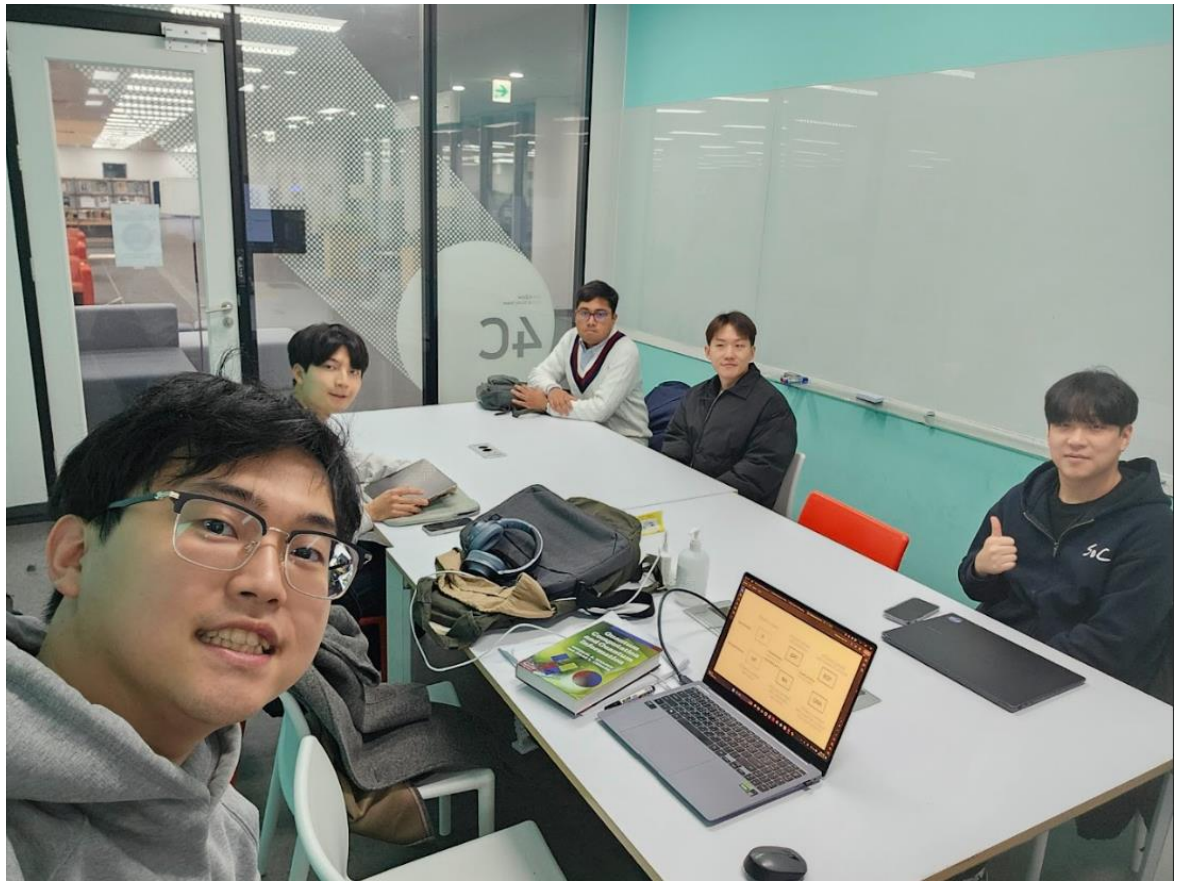
Let X be an $n \times n$ matrix over $\mathbb{C}$. Assume that $X^2 = I_n$. Let Y be an arbitrary $n \times n$ matrix over $\mathbb{C}$. Let $z \in \mathbb{C}$. (i) Calculate $\exp(zX)Y\exp(-zX)$ using the *Baker-Campbell-Hausdorff formula*

$$e^{zX}Ye^{-zX} = Y + z[X,Y] + \frac{z^2}{2!}[X,[X,Y]] + \frac{z^3}{3!}[X,[X,[X,Y]]] + \cdots .$$

(ii) Calculate $\exp(zX)Y\exp(-zX)$ by first calculating $\exp(zX)$ and $\exp(-zX)$ and then doing the matrix multiplication.

BQIT Study (Winter 2024, about 40 participants)





Activities: Advanced

Intro Seminars

Weekly seminars introducing topics related to quantum computing to students who have studied quantum information and quantum mechanics at the undergraduate level.

Topics: Photonics, Quantum sensing, Quantum cryptography, Quantum Communication, Quantum Machine Learning, Quantum Chemistry, Quantum Many Body Theory

Quantum Hardware (Superconducting, Trapped Ions, Neutral atoms, NV Diamonds, Topological, etc)

Journal Clubs

Weekly journal reviews

Past topics: Quantum Key Distribution over 307 km, Gaussian Boson Sampling, VQE enhanced by neural networks, Stabilizer simulation of quantum circuits, Quantum convolution neural network, etc

Summer/Winter Meeting + Undergraduate student meeting (Jun, Dec)

Held face-to-face meetings twice a year, invited external speakers (Winter 2024: Prof. Hyukjoon Kwon from KIAS)

Quantum information undergraduate student meeting for sharing lab intern experiences

Journal Clubs

Quantum Information Science Club Association

QISCA Journal Club

February 2025

Feb. 03 19:00 — Various Methods of Quantum Gate Decomposition — Chanmin Park, *EQS (KAIST)*

Feb. 03 19:30 — Two-Qubit Engine Fueled by Entanglement and Local Measurements — Hosung Kwak, *EQS (KAIST)*

Feb. 10 19:00 — Many-body Physics on Rydberg Atom Quantum Simulator — Kyeongmyeong Jo, *QUICK (Korea U.)*

Feb. 10 19:30 — Practical Quantum Key Distribution over 307km of Optical Fibre — Juhyun Song, *QUICK (Korea U.)*

Feb. 17 TBA — Quantum Teleportation in Quantum Computing — Woojin Jung, *SQRT (SNU)*

Feb. 17 *TBA — Quantum Applications of NV centers — Daniel Ohm, *SQRT (SNU)*

*Due to the presenter's overseas schedule, Journal Club time would likely to be announced later

Feb. 24 19:00 — Basic of Superconducting Qubits — Hyeongmin Lim, *QIYA (Yonsei U.)*

Feb. 24 19:30 — Quantum Convolution Neural Network — Minseok Kim, *QIYA (Yonsei U.)*

President: SungBin Lee (010-9650-0718), Vice President: Seonggeun Park (010-8748-9605)
Manager: Jeongwoo Lee (010-4798-6403), Email: koreaquantumclubs@gmail.com

SNU QUANTUM RESEARCH TEAM | EQS Entangled Qubits Society | QIYA

Winter 2024 Meeting (Dec 23rd, 45 participants)

QISCA Activities: exchanges and visiting

■ Visiting National Research Institutes and Companies

Promoting visits to domestic quantum-related research institutes and companies

Institutes: KIST Quantum Information Research Center, IBS Quantum Nanoscience Research Center, ETRI Quantum Technology Research Center, KRISS Superconducting Quantum Computing System Research Center, etc.

Companies: Pasqal Korea, SDT, ID Quantique, Norma, Orientom, GQT Korea, Dream Security, etc.

Special: Yonsei University Songdo International Campus Quantum Computing Center (127 qubits!!)

■ Quantum Competitions and Hackathons

Participating in domestic and international quantum information competitions

Domestic: Quantum Information Competition (June), Quantum Challenge (November), etc.

International: MIT iQuHack (February), Xanadu QHack (February-March), IBM Quantum Challenge (July), etc.

■ International Exchanges

Exchange with overseas quantum information clubs

Quantum Coalition (United States Quantum Information Club), UC Quantum Society (University of Chicago Quantum Information Club), etc.

Quantum Hackathon Participations

Xanadu QHack 2023
1st, 3rd, 4th / 800 Teams

Xanadu QHack 2024
2nd, 3rd, 9th / 645 Teams

MIT iQuHACK 2024 IonQ Challenge 1st

International exchanges (with UChicago Quantum Society)

Monthly Newsletters

QISCA News

Hilbert Space

VOL.II. . . No.1 FEBRUARY 16, 2025 ZERO DOLLARS

January QISCA Journal Club Held

By SEONGGEUN PARK

The January 2025 QISCA Journal Club sessions were successfully held on January 6th, 13th, 20th, and 27th.

January Joint Seminar

During the January 6th session, Hyeoncheol Joo from QUICK delivered a presentation titled *Homomorphic Encryption in Quantum Computing*. The presentation introduced the overall structure of quantum homomorphic encryption (QHE), along with experimental designs and results for implementing QHE.

On January 13th, Wonseok Heo from EQS presented *Entanglement in Linear Optics*. The session began with a proof of the Cramer-Rao bound, followed by an introduction to quantum properties such as negativity, log-negativity, concurrence, and quantum geometric discord. Methods for experimentally measuring these properties and the corresponding results were also discussed.

On January 20th, Seongbin Lee from SQRT gave a talk on *Quantum Computational Advantage and Gaussian Boson Sampling*. The presentation explained what Gaussian boson sampling is and how it demonstrates quantum advantage. It also included discussions on experimental implementations, results, and a 2024 publication addressing cases where classical simulations are feasible.

Finally, on January 27th, Eunhyuk Jang from QIYA presented *Taming QAOA Ansatze via Different States*. The session focused on techniques to mitigate errors arising from the unique characteristics of individual qubits, and the application of these techniques to the Quantum Approximate Optimization Algorithm (QAOA) was discussed, along with the resulting improvements.

UChicago-SNU Winter Internship Program Launched

By SEONGGEUN PARK

The "UChicago-SNU Winter Internship Program", a joint internship program between the University of Chicago and Seoul National University, has officially begun. This program runs for two months during the winter break.

Professor Cheng Chin with Participants

Sungbin Lee, Daniel Donghyon Ohm, Sehyun Oh, and Youngyeon Kim of SQRT are participating in this program. This program offers invaluable international research experience to SNU students while strengthening academic collaboration between the two universities.

Participation in the UC Quantum Undergraduate Symposium

By SUNGBIN LEE

On January 15, Sungbin Lee (President of QISCA), Daniel Donghyon Ohm(Vice President of SQRT), and Sehyun Oh (SQRT Executive Member) participated in the UC Quantum Undergraduate Symposium.

The symposium featured a one-hour panel discussion with undergraduate research interns from various laboratories, accompanied by light snacks. The event attracted significant participation, including many students who were not affiliated with UC Quantum, highlighting the strong interest in undergraduate research opportunities.

UC Quantum Symposium

U.S. universities foster a culture where undergraduates actively engage in research from an early stage. Accordingly, many of the questions raised during the symposium revolved around how to build a strong research portfolio for graduate school applications. Additionally, students were keen to learn about how professors interact with undergraduates, the extent to which undergraduates can contribute to research, and the opportunities available to gain meaningful research experience in each laboratory.

Inspired by this event, SQRT aims to organize a similar event in mid-March

QISCA News

Hilbert Space

VOL.II. . . No.1 FEBRUARY 16, 2025 ZERO DOLLARS

1월 QISCA 저널클럽 진행

By SEONGGEUN PARK

2025년 1월 QISCA 저널클럽이 진행되었습니다. 1/6, 1/13, 1/20, 1/27에 세션이 진행되었습니다.

1월 연합세미나

1/6 세션에서는 QUICK의 주현철님이 *Homomorphic Encryption in Quantum Computing*을 주제로 발표를 하였습니다. Quatum homomorphic encryption (QHE)의 전체적인 구조도에 대해서 소개를 하고, QHE를 구현하기 위한 실험 설계 및 실험 결과를 소개하였습니다.
1/13 세션에서는 EQS의 허원석님이 *Entanglement in Linear Optics*을 주제로 발표를 하였습니다. Cramer Rao bound 증명을 시작으로 양자적인 값인 Negativity, Log-negativity, Concurrence, 그리고 Quantum geometric discord에 대해 소개하였고 이것을 실험으로 측정하는 방법 및 결과에 대해 다루었습니다.
1/20 세션에서는 SQRT의 이성빈님이 *Quantum Computational Advatage and Gaussian Boson Sampling*을 주제로 발표를 하였습니다. Gausian boson sampling이 어떤 것인지, 어떻게 양자 이득을 보일 수 있는지에 대해 언급하였습니다. 또한, 실험적인 구현 및 결과 대해 소개하고 2024년에 논문으로 출판된 고전적으로 시뮬레이션이 가능한 경우에 대한 논의에 대해 언급을 하였습니다.
1/27 세션에서는 QIYA의 장은혁님이 *Taming QAOA Ansatze via Different State* 에 대해 다루었습니다. 각 큐비트가 가지는 특성에 따라 생기는 오류를 보완하기 위한 기법에 대해 소개를 하였고, 이를 QAOA에 적용한 결과를 소개하였습니다.

UChicago-SNU Winter Internship 진행

By SEONGGEUN PARK

서울대학교 학생들 대상으로 사카고대학교와의 공동 프로그램인 "UChicago-SNU Winter Intership Program"이 시작이 되었습니다. 이 프로그램은 겨울방학 두 달간 진행됩니다.

Cheng Chin 교수님과 인턴십 참가 학생들

SQRT 소속의 이성빈, 엄동현, 오세현, 김영연 학생이 참여를 하였으며, 이 경험은 글로벌 인재로 성장하는 발판이 될 것입니다.

UC Quantum 학부생 간담회 참가

By SUNGBIN LEE

1월 15일, QISCA 회장 이성빈, SQRT 부대표 엄동현, 그리고 SQRT 임원 오세현이 UC Quantum 학부생 간담회에 참가하였습니다.

UC Quantum의 학부생 간담회는 연구실별 인턴 학부생 한 명을 패널로 초청하여 약 1시간 동안 진행되었으며, 간단한 다과와 함께 다양한 논의가 이루어졌습니다. 특히, UC Quantum 소속이 아닌 학생들도 다수 참석하며 학부 연구에 대한 높은 관심을 보여주었습니다.

UC Quantum 간담회

미국 대학의 경우, 학부 단계부터 연구에 적극적으로 참여하는 문화가 자리잡고 있어, 학생들의 질문 또한 대학원 입시를 위한 연구 실적을 어떻게 쌓을지에 대한 부분이 많았습니다. 또한, 각 교수님들이 학부생들을 대하는 태도, 학부생의 연구 참여도에 대한 질문이 많았습니다.

본 행사에서 영감을 받아 SQRT는 2025년 3월 중순을 목표로, QSICA는 2025년 6월말 개최 예정인 2025년 하계 연합 발표회에서 비슷한 활동을 추진할 예정입니다.

QISCA에서 간담회를 진행할 때는 연구실 분위기, 교수님의 학부생 지도 스타일, 연구 참여 및 실적 쌓기에 용이한 정도, 연구 환경, 지도 교수님과 좋은 관계 만드는 방법, 논문 작성 팁 등 대학원 진학 시 필요한 연구 실적을 얻는데 도움이 되는 정보를 중심으로 사전 질문을 받은 후 진행할 것입니다.

Member club: EQS (KAIST)

■ Entangled Qubits Society

Established in Sep. 2022, 46 members as of Oct. 2024

- Physics 33%, Electrical and Electronic Engineering 33%

President: Jeongwoo Lee (Junior, Physics & Chemistry)

Vice President: JongYeon Lee (Sophomore, Physics)

Supporting organization: KAIST Dept. of Electrical and Electronic Engineering

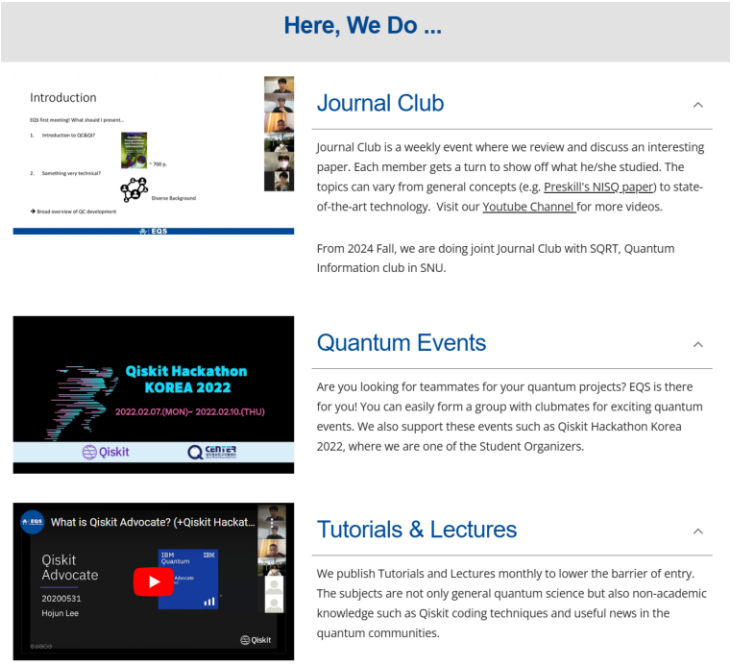
Website: https://sites.google.com/view/eqs-kaist Official email: eqskaist2022@gmail.com

■ Major activities

Weekly Journal Club: Various topics are selected

Study: Quantum information theory, Quantum information in CMP

Qiskit Hackathon Korea 2022 Student Organizing Committee



Member club: QUICK (Korea U.)

■ Quantum Information Club at Korea University

Established in Mar. 2023, 32 members as of Oct. 2024

- Electrical and Electronic Engineering 31%, Physics 19%, Computer Science 16%

President: Juhyun Song (Senior, Electrical and Electronic Engineering)

Vice President: Sungheum Yoo (Junior, Physics)

Supporting organization: School of Quantum at Korea University

Website: https://quick.oopy.io/ Official email: kuquickofficial@gmail.com

■ Major activities

Seminars: Quantum mechanics, quantum computation theory, etc.

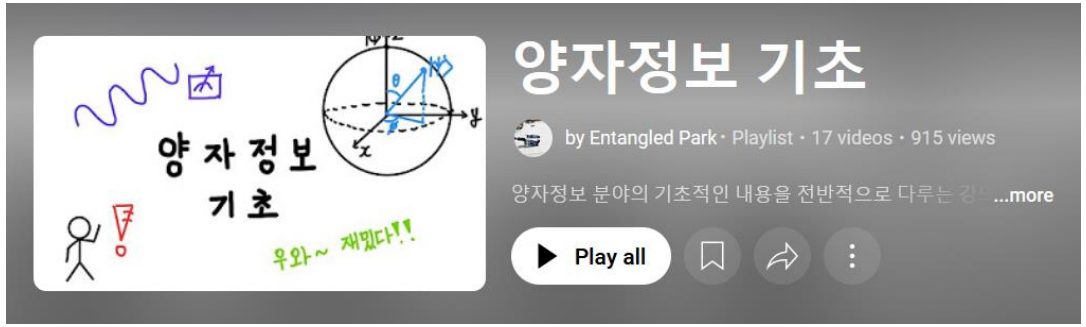
Group study: Qiskit, quantum machine learning, Manim, etc.

Qiskit Fall Festival: 2023, 2024

Competitions

- MIT IQuHACK 2024 remote challenge IonQ division: 1st place
- Xanadu Qhack 2024: 9th place

BQIT (Basic Quantum Information Theory)



Member club: SQRT (SNU)

■ SNU Quantum Research Team

Established in Sep. 2022, 74 members as of Oct. 2024

- Physics and Astronomy 40%, EECS 15%, Computer Science and Engineering 15%

President: Yoonjin Bae (Senior, Physics and Astronomy)

Vice President: Daniel D. Ohm (Senior, Physics and Astronomy)

Supporting organization: SNU Research Center for Quantum Science and Technology

Website: https://sites.google.com/view/sqrt-quantum Official email: snuquantums@gmail.com

■ Major activities

Study: Quantum physics, Quantum computing, Qiskit, Quantum error correction, etc.

Project: Tensor network, Randomized benchmarking, Erasure qubits (paper in preparation)

Internship: SNU, KIST (Korea Institute of Science and Technology) internship in progress

Qiskit Fall Festival: 2023

Competitions

- Xanadu Qhack 2023: 1st, 3rd, 4th place, 2024: 2nd, 3rd place
- IonQ Quantum Challenge 2023: Minister's Award, Grand Prize, Excellence Award

Member club: QIYA (Yonsei U.)

■ Quantum Informatics at Yonsei Academy

Established in Sep. 2024, 22 members as of Oct. 2024

- Physics 63%, Electrical and Electronic Engineering 18%

President: Hyeongmin Lim (Senior, Electrical and Electronic Engineering)

Vice President: Seokwon Choi (Junior, Physics)

Supporting organization: Institute of Quantum Information Technology, Yonsei U. (IQIT)

Website: https://qiya-yonsei.github.io/ Official email: qiyayonsei@gmail.com

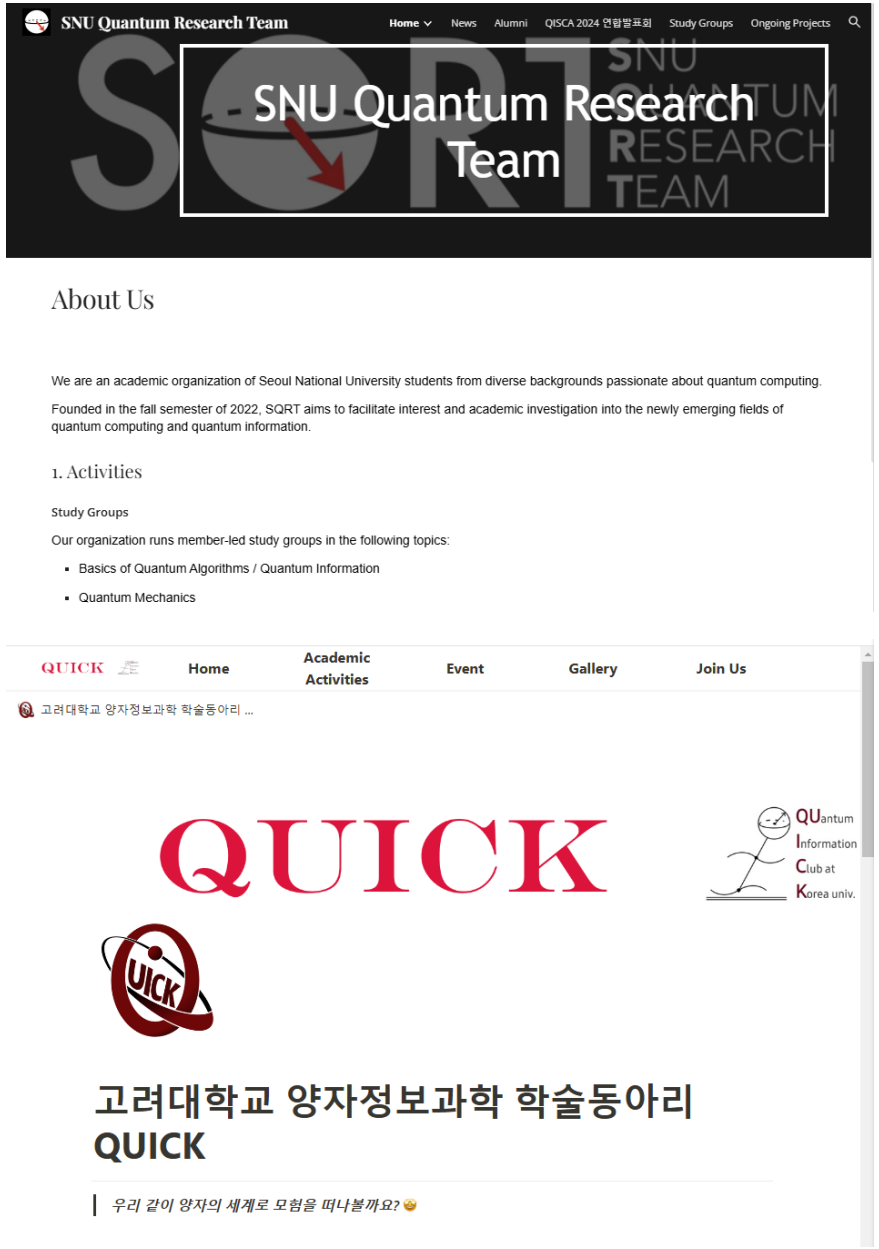
QIYA

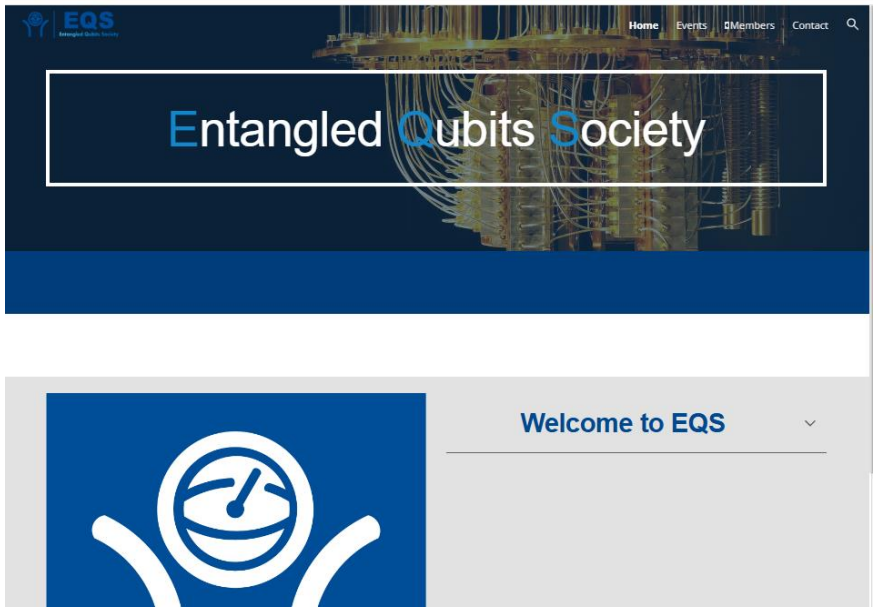
■ Major activities

Group study, Paper review, Research projects, Competitions

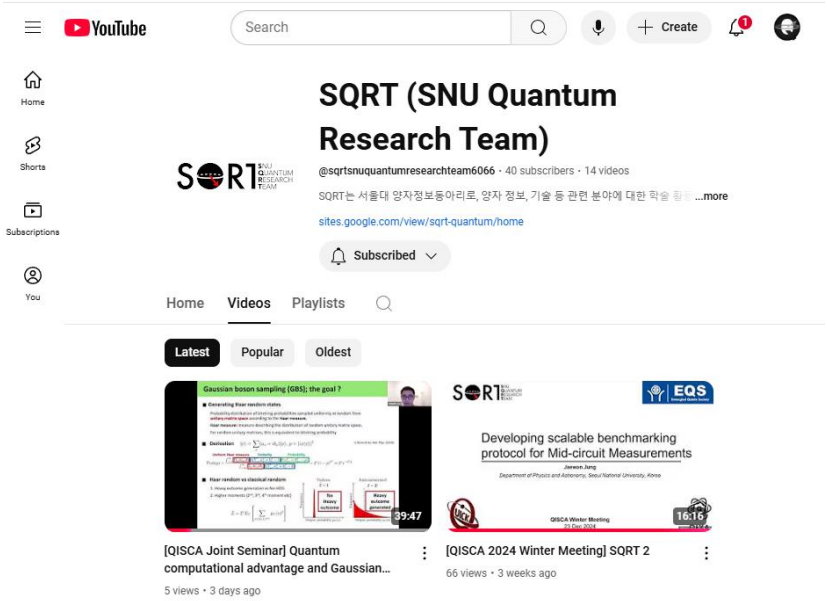
Qiskit Fall Festival: 2024

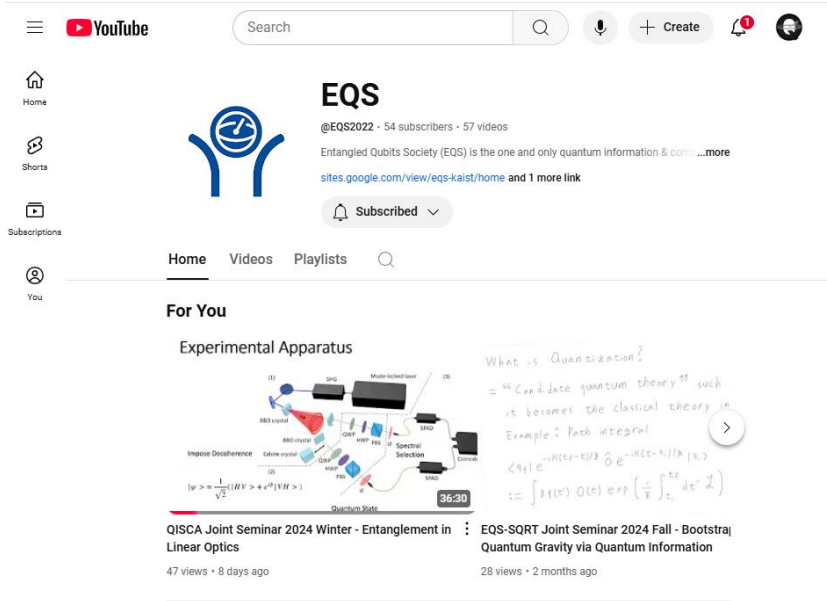
Websites for each clubs

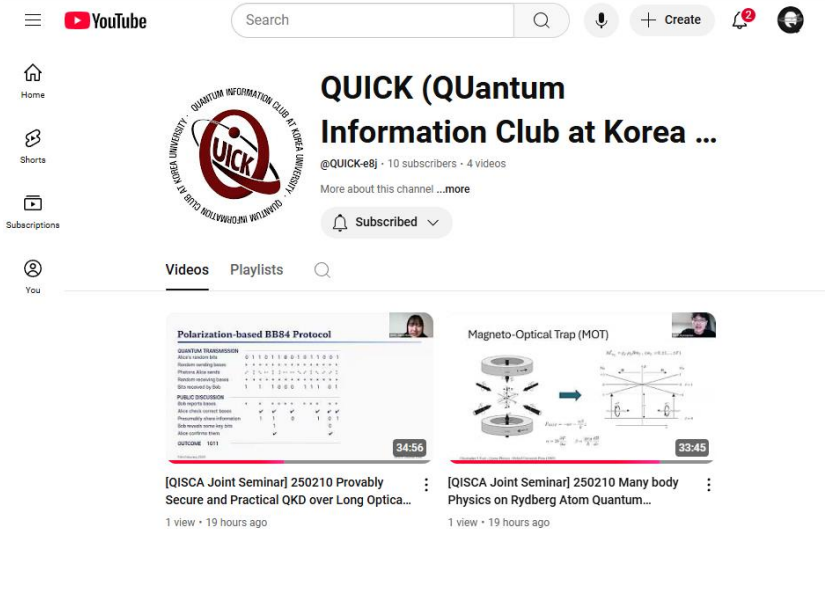


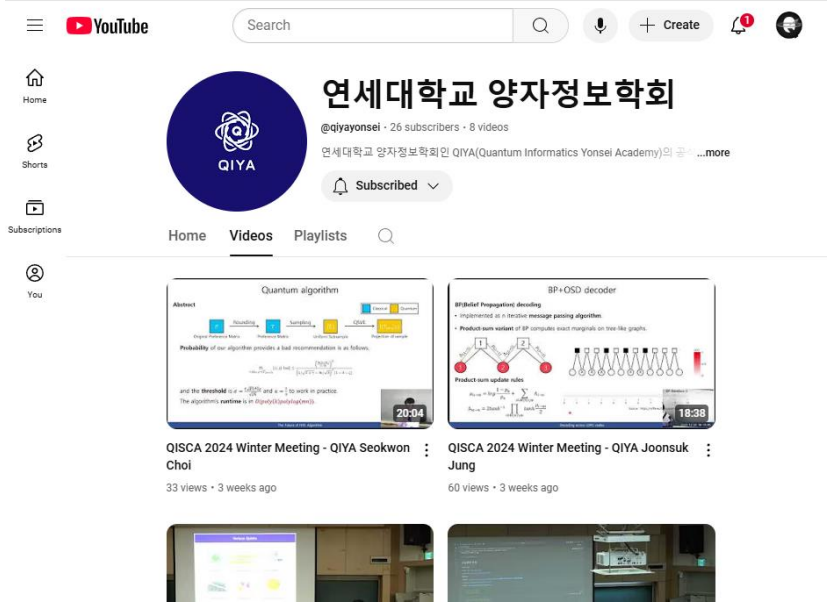


YouTube Channels for each clubs

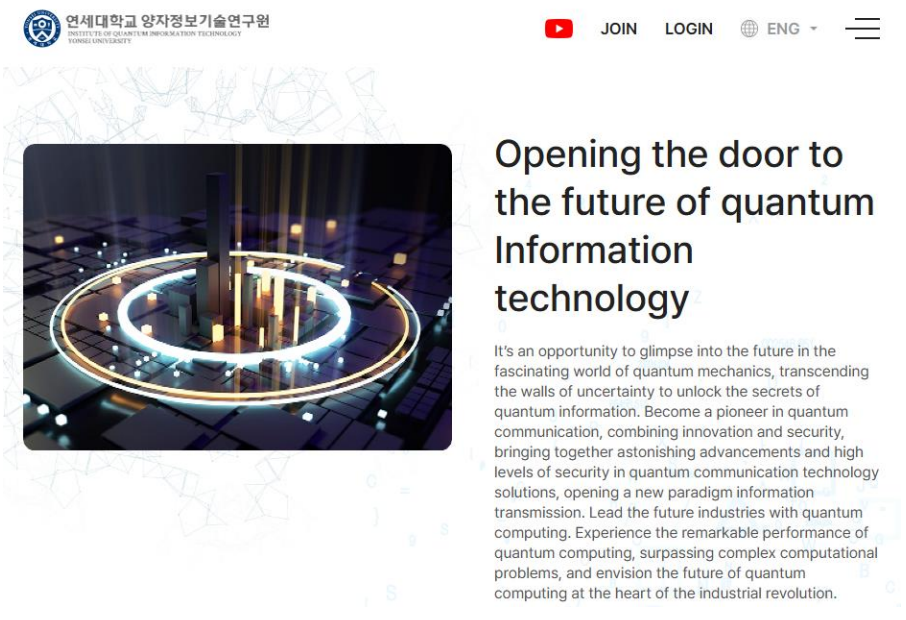








Supporting Organizations for each clubs



Thank you!

Any club interested in quantum information science is welcome!

Please feel free to contact

President SungBin Lee (rqtoe@snu.ac.kr) or

QISCA official email (koreaquantumclubs@gmail.com) if you have any questions!

QISCA

QUANTUM INFORMATION CLUB AT KOREA UNIVERSITY · QUANTUM INFORMATION CLUB AT KOREA UNIVERSITY · UICK

SQRT SNU QUANTUM RESEARCH TEAM

EQS Entangled Qubits Society

QIYA