Feedback Report (Week 03)

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Name 이건

Title: Quantum Computing

Speaker: Professor Dongmoon Min

After attending this week's seminar, please write a brief summary of the content along with your comments. Your response should be approximately half a page in length.

이번 주 세미나를 듣고, 세미나의 내용을 간단히 요약한 뒤, 이에 대한 본인의 생각이나 의견을 작성하시기 바랍니다. 전체 분량은 약 0.5페이지 내외로 작성하여 제출하시기 바랍니다.

1. Summary

Briefly summarize the main content of this week's seminar.
이번 세미나의 주요 내용을 간단히 요약하세요.

Professor Dongmoon Min's research primarily focuses on architecting a large scale fault-tolerant quantum computers (FTQC) using a full-stack approach. His work focuses on optimizing scalability and error rates to enable a functional million-qubit FTQC capable of running practical quantum applications.

There are 3 steps the professor took to design the large scale quantum computer system: 10+K qubit quantum-classical interface(QCI) design, followed by a 10+K qubit quantum control processor(QCP) design, then designing a million qubit FTQC using the two designs. Through manipulations and adjustments to reduce the bottlenecks, the QCI and QCP that support 10+K qubits were successful. As for the million-qubit FTQC, the professor had to consider the erroneous error syndrome measurement(ESM) and the slow & inaccurate error decoding caused

by the multi-refrigerator (Multi-DR) system. The three suggested solutions of the professor were quantum classic hybrid ESM, nine-logical-qubit granular decoding, and ensemble error decoding. All of these solutions produced a significant improvement in speed and error rates, making the million-qubits FTQC capable of running quantum applications.

2. Comments

Please include your comments, noting what you found interesting, what you would like to learn more about, and your personal thoughts on the seminar.
이번 세미나에서 흥미로웠던 부분, 더 알고 싶은 주제, 그리고 본인의 생각을 자유롭게 작성하세요.

The topic of FTQC was quite interesting, but it sounds a bit heavy. The professor was really able to simplify his topic for the general audience to understand the overview of his research and field. I would really like to see the professor's research being applied in future million-qubits FTQC.