SUPERCONDUCTING QUANTUM COMPUTING ARCHITECTURE

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ABSTRACT REPORT

“Quantum computing” is one of the phrases that invoke the imagination of future technology. Despite the incredible power of today’s supercomputers, many complex computing problems cannot be addressed by conventional systems. The huge growth of data and our need to better understand everything from the universe to our own DNA, leads to seek new tools that can help us provide answers. Quantum computing is the next frontier in computing, providing an entirely new approach to solve the world’s most difficult challenges. Since 1982, Richard Feynman proposed the idea of quantum computing for the first time, it has become a new field of interest for many physics and computer scientists. Although it’s more than 30 years since this concept has been presented, but it’s still considered unknown and several subjects are open for research.

Superconducting Quantum Processors are considered to be one of the most promising candidate technology to implement QC. Due to the rapid development of superconducting quantum computing, the global race to quantum computer is in full swing. Many technology industries including Google, IBM, Microsoft as well as Intel, are jockeying for a position in quantum computing. All these advances and efforts have brought a promising future for superconducting quantum computing. In this seminar, a brief idea about the basics and fundamental concepts of superconducting quantum computing, superconducting qubits, the qubit design, and quantum processor will be introduced in focus to its architecture, along with an overview of different quantum computers from companies like IBM and D-wave.

All these companies are developing quantum computing systems to tackle complex computations for business and financial modelling, medical researches, machine learning, communication, cryptography and engineering services. Quantum computers can solve problems which are impossible or those which take an impractical amount of time (millions years) to solve in a traditional computer. Hence, quantum computers will change the world, leads to a better and faster solutions for the most challenging problems and so for the unprecedented applications.

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