Plenary 3

Quantum Computing with Super Conducting Circuits, Markus Brink, IBM T. J. Watson Research Center

Quantum computing has made tremendous progress in recent years, including experimental advances and hardware developments. Quantum processors have scaled significantly in size, as measured by the number of quantum bits (qubits) connected on a chip, with devices incorporating 10's of qubits available today. An example of a publicly available quantum system is the IBM Q Experience (www.research.ibm.com/ibm-q). While the goal of fault-tolerant universal quantum computing is still some time away, early applications and demonstrations can be implemented on smaller scale near-term quantum systems. Among the different hardware implementations, Josephson-junction-based superconducting quantum circuits are a promising technology to scale quantum processors. Together with scaling the number of qubits, other metrics need to evolve and improve as well, such as the quality of qubits, hardware integration, and system level performance. In this talk, I will look at the current status and discuss some remaining challenges.