TITLE: The Josephson Effects and the Josephson Junctions as a Qubit

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This report investigates primarily the Josephson effects and the use of the Josephson junction as a qubit (quantum binary digit). The Josephson effects arise when current flows across two weakly coupled superconductors. One of the reasons for the versatility of the Josephson junction is its ability to switch rapidly from the superconductive state to the normal (resistive) state in a matter of picoseconds. Quantum Information Science (QIS) is a relatively new field that has been revolutionising advances in fields of science and engineering involving computation, communication and so on. A lot of research is currently being done in the domain of quantum computing and the use of the Josephson junction as a qubit in a quantum computer. In the report, it is seen that quasiparticles in the Josephson junction cause decoherence.Two methods used to decrease the number of quasiparticles present in the junction were then explored.