Development of a YBCO Quantum Processor

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In this study, a quantum processor was developed using a YBCO superconductor (high critical temperature). The YBCO superconductor was made through a mixture of individual chemicals. Josephson junctions (JJ) were formed by these superconductors with the insulators made out of saran wrap. An oscilloscope is used to read out the wave state of the qubit and a signal generator is used to apply fundamental quantum gates on the system. Wave states between the control battery and the JJ differed, possibly due to noise or environmental effects. Error variability was cleaned using a Kalman filter. The qubit is tested and is able to perform quantum tunneling. In contrast to prior quantum computers, this processor runs at 77 K while the previous processors run at 0.02K. This computer is also cheaper and safer. A cost analysis was done to show that the average cost of a YBCO qubit is $80.00, scaled upward. The prior qubit (Al/AlOx/Al) is $7500.00, scaled upward.

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