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Long Time Electrical Stability of Plasma Oxidized Aluminum Tunnel Barriers ZACHARY BARCIKOWSKI, JOSH POMEROY, National Institute of Standards and Technology, Gaithersburg, MD — By measuring resistance-area product values over time, we assess the electrical stability of tunnel junctions with plasma oxidized AlOx tunnel barriers. AlOx is a commonly used material in the superconducting qubit community due to its ease of fabrication, but often has a high density of electrically active defects. We believe that plasma oxidation, as opposed to the standard thermal oxidation, can lead to tunnel barriers with lower defect densities and improved electrical properties. This talk will present measurements taken on tunnel barrier devices taken over a period of months and correlate observed stability/instability with the process conditions used to fabricate them.

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