

Advanced Modeling Tools for Superconducting Circuit Development

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Abstract—Superconducting electronics are key to several cutting-edge technologies and initial demonstrations show that they are poised to impact the world in a multitude of areas. Northrop Grumman has been researching advanced modeling and simulation tools to enable the development of these technologies. Detailed circuit models promote innovation in the design by revealing complex device behavior early in the development cycle. Our 3D simulations of superconducting physics bring computational power to bear to increase device reliability with respect to environmental conditions and fabrication variability. We make comparisons to test results to increase confidence in the model and reduce risk in future iterations. Detailed, validated models are critical to the continued advancement of superconducting technologies.

Keywords (Index Terms)— Digital, Quantum Computing, Josephson Devices, Flux Pinning, Qubit

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