

Empowering Quantum Design: Advanced EDA Tools and Services for Superconducting Circuits

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Abstract—Superconducting quantum technologies demand unprecedented accuracy in circuit modeling and simulation. Yet, existing design tools often fail to address the unique challenges quantum hardware presents, including precise impedance control, magnetic flux sensitivity, and stringent layout verification. In this talk, we introduce SUN Magnetics' specialized electronic design automation (EDA) solutions, developed specifically for superconducting quantum circuit design. Our tools enable precise impedance extraction critical to quantum coherence, sophisticated magnetic field simulations that enable designers to reduce flux noise and crosstalk, and advanced layout verification tailored explicitly to superconductors. Moreover, we highlight our analog simulation tools designed to reliably model quantum interfaces and superconducting front-end electronics under cryogenic conditions. Beyond software, SUN Magnetics also provides customized design and expert consulting services, partnering closely with clients to overcome complex quantum hardware challenges and accelerate innovation cycles. Finally, we outline future advancements and collaboration opportunities aimed at fostering an integrated quantum design ecosystem, essential for achieving scalable, high-performance quantum computing solutions.

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