Keys Needs in the Technology Roadmap for Superconductor Electronics

D. Scott Holmes

International Roadmap for Devices and Systems (IRDS)

E-mail: d.scott.holmes@ieee.org

Abstract—**A technology roadmap for superconductor electronics is under development within the framework of the International Roadmap for Devices and Systems (IRDS). Significant technology improvements are required for superconductor electronics to meet the needs expected for applications such as quantum computing, artificial intelligence, or large-scale digital computing. Metrics for improvement include circuit density, chip or system complexity, and energy efficiency. Key needs are identified in areas including fabrication processes, devices, logic families, and system architectures. Metrics and methods are under development to evaluate potential solutions for the key needs. A challenge is that evaluation of overall benefit often requires large-circuit or system-level modeling, which can be difficult without the necessary electronic design automation (EDA) tools.**

Keywords (Index Terms)—**Superconductor electronics, technology roadmaps, logic families**