New Roadmapping Effort for Cryogenic Electronics and Quantum Information Processing Seeks Participants

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July 30, 2018 (STH59/HP134). A new International Focus Team (IFT) on **Cryogenic Electronics and Quantum Information Processing** has been established within the International Roadmap for Devices and Systems (IRDS). This development is a significant opportunity for superconductor electronics to join with the greater electronics community in developing technology roadmaps. The goal is to coordinate research and development efforts so that superconductor electronics can provide developing applications with solutions when needed. Additional participants are needed in the areas of superconductor electronics, cryogenic semiconductor electronics, and quantum information processing.

Background

The International Technology Roadmap for Semiconductors (ITRS) projected technology requirements and potential solutions for semiconductors from 2001 to 2014. The ITRS used transistor feature sizes, density, clock rate, and other metrics to roadmap the future of integrated circuits. In 2015, the ITRS committee presented a new roadmap, called ITRS 2.0, for key systems that contain integrated circuits and drive process, design, and integration technologies. Subsequent partnering of ITRS 2.0 with the IEEE Rebooting Computing (IEEE RC) Initiative resulted in the International Roadmap for Devices and Systems (IRDS).

The IRDS mission is to "Identify the roadmap of electronic industry from devices to systems and from systems to devices", which represents a broadening of the scope. Each IRDS team will assess present status and future evolution of the ecosystem in its specific area and produce a 15-year roadmap.

2017 IRDS reports

In 2017, Cryogenic Electronics organized as one of two emerging application areas within the IRDS Beyond CMOS International Focus Team. An international team of 21 people covered superconductor electronics, cryogenic semiconductor electronics, and cryogenic quantum computing. The Cryogenic Electronics section in the 2017 Beyond CMOS report has 10 pages of text, 6 pages of references, and 6 spreadsheet tables.

Press release: https://www.businesswire.com/news/home/20180618005183/en

Reports: https://irds.ieee.org/roadmap-2017

Beyond CMOS (PDF, 3 MB) see section **4.2 Cryogenic Electronics**

Beyond CMOS tables file (XLSX, 202 KB)

Next steps

In 2018 the Cryogenic Electronics and Quantum Information Processing team will prepare a separate report due at the end of November.

Coverage for each area will include:

1. Applications and Market Drivers
2. Present Status
3. Active Research Questions
4. Metrics
5. Roadmap

Schedule

- September-October: Assemble draft report
- November 2: Special session Superconductor Electronics Technology Roadmap for IRDS 2018 at the Applied Superconductivity Conference in Seattle, WA, USA http://ascinc.org/conference-program/special-sessions/
- November 6: Presentation at the IRDS meeting in Tysons, VA, USA https://rebootingcomputing.ieee.org/rebooting-computing-week
- November 27: Submit final draft of chapter to IRDS for review and editing.

If you are interested in participating or would like more information, please contact me.

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