

# TcSUH BI-WEEKLY PI WEBINAR

Thursday, November 12, 2020 – 12:00 p.m. to 1:00 p.m.

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## High Performance REBCO Superconducting Tapes: R&D and Applications

### Prof. Venkat Selvamanickam

Department of Mechanical Engineering, University of Houston; TcSUH PI

**ABSTRACT:** Tremendous progress has been made in the past two decades in the development and roll-to-roll (R2R) manufacturing of thin film RE-Ba-Cu-O (REBCO, RE=rare-earth) superconductor tapes world-wide. Based on a unique biaxially-textured substrate/buffer architecture and epitaxial film growth, REBCO tapes have been demonstrated with high critical current densities over a wide range of temperatures – 4.2K to 77K. Recently, there is a tremendous demand for REBCO superconductor tapes for ultra-high magnetic field applications at 20 T and beyond. REBCO tape have already enabled commercial nuclear magnetic resonance spectroscopy (NMR) systems operating beyond 1 GHz. REBCO tapes are now driving the technology of compact fusion where fusion reactors with energy gain of 10 are being developed at a fraction of the size and cost of the international thermonuclear experimental reactor (ITER). Beyond high magnetic field applications and power applications, research on REBCO tapes also includes new applications such as microwave transmission lines for quantum computing. Our group is at the forefront of R&D of REBCO superconductor tapes for several applications and our ongoing research in this field will be discussed in this presentation.

**BRIEF BIO:** Dr. Venkat Selvamanickam is a M.D. Anderson Chair Professor of Mechanical Engineering, TcSUH Director of the Applied Research Hub, and the Director of the Advanced Manufacturing Institute at the University of Houston. Previously, he was the Chief Technology Officer of SuperPower Inc, a former subsidiary of Philips Electronics. He led SuperPower to multiple world-records, the longest thin film superconductor made and first to pilot manufacturing. He led the world's first significant delivery of thin film superconductor tapes to build a power transmission cable in Albany, NY, which is the world's first superconductor device in the power grid. At UH, Dr. Selva led a highly successful Department of Energy (DOE)-funded program to quadruple the performance of superconductor tapes and now leads another DOE-funded program on advanced manufacturing of these tapes. Dr. Selva has published 275+ papers and holds 52 issued U.S. patents and over 80 issued international patents. He is the recipient of the Presidential Early Career Award for Scientists and Engineers from the White House. He has also received three R&D 100 awards, the Superconductor Industry Person of the Year award, Wire and Cable Technology International Award and the IEEE Dr. James Wong Award. Dr. Selva is a Fellow of IEEE and the U.S. National Academy of Inventors.