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Topic of the Speech:
Quantifying the Parasitic Capacitance of Conductive Yarns Used in High-Frequency Applications

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Professor Terry Ye is the Professor at the Department of Electrical and Electronics Engineering (EEE) of Southern University of Science and Technology (SUSTech), and by courtesy, an Adjunct Professor at the Department of Electrical and Computer Engineering (ECE) of Carnegie Mellon University. Dr. Ye is active in academic research as well as industrial applications in many engineering areas that include IC Designs, Neuromorphic Computing ICs, Internet-of-Things (IOT) and Wireless Sensor Devices.

Dr. Ye received his Ph.D. in Electrical Engineering from Stanford University and the Bachelor of Science in Electronic Engineering from Tsinghua University (Beijing). Prior to SUSTech, Dr. Ye had been the Professor of CMU-SYSU Joint Institute of Engineering since 2014, as well as the Director of Research and Technology Development of Hong Kong R&D Center for Logistics and Supply Chain Management (LSCM) since the center's inception in 2007. He also serves as the research fellow at the University of Hong Kong and the Chief Scientist of IOT Lab at Hong Kong University of Science and Technology. Beside his academic activities, Dr. Ye is keen on industry-academic collaborations. He had held various engineering and consulting roles in China Academy of Science, Impinj Inc., Synopsys Inc., Analog Device Inc., Magma Design Automation Inc., Silicon Architects Inc. and many other Silicon Valley companies.

ABSTRACT SUBMISSION
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Quantifying the Parasitic Capacitance of Conductive Yarns Used in High-Frequency Applications

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ABSTRACT (NO MORE THAN 500 WORDS:)

Conductive yarns are commonly used to construct e-Textile devices like antennas, inductors, interconnect, and sensors, etc. However, conductive yarns aren't a straightforward replacement for metallic wires; their microstructure introduces parasitic capacitance, often overlooked, leading to performance degradation in high-frequency applications. In this study, we propose a lump-sum and turn-to-turn model for air-core helical inductors constructed from conductive yarns to analyze and quantify their parasitic elements. We compare the frequency response of copper-based and yarn-based inductors with identical structures to extract the parasitic capacitance. Our measurements show that the unit-length parasitic capacitance of commercial conductive yarns ranges from 1 fF/cm to 3 fF/cm, depending on the yarn's microstructure. These results can be used as guidelines for the design and characterization of e-Textile devices.