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Title: Reconfigurable RF Front-ends

Early wireless pioneers relied on radio broadcasting to communicate. Our cell phones still use this 100-year-old idea. The next generation of 5G communication systems is expected to change this for the first time. Unlike broadcasting, 5G systems will rely on efficient point-to-point communication enabled by advanced millimeter-wave electronics and antenna arrays. Reconfigurable multiband microwave/mm-wave devices up to 100 GHz are envisioned for such systems. Their multifunctional characteristics tend to impose performance and cost requirements that cannot be met yet. In this talk I will review our work on high-performance RF front-end components including tunable resonators, filters, limiters and switches. The emphasis will be on technology solutions based on tunable miniaturized cavities and cold-plasma electronics for sub-GHz to over 100-GHz bands. We will also present novel multi-band solutions based on these concepts.

Dimitrios Peroulis is the Michael and Katherine Birck Head and Reilly Professor of Electrical and Computer Engineering at Purdue University. His current research interests are in the areas of reconfigurable electronics, cold-plasma RF electronics, and wireless sensors. He has led multiple government and industry programs focused on high-quality-factor reconfigurable systems. Professor Peroulis received his PhD degree in Electrical Engineering from the University of Michigan at Ann Arbor in 2003. He has co-authored over 380 journal and conference papers and is an IEEE Fellow. He received the National Science Foundation CAREER award in 2008. In 2012 he received the Outstanding Paper Award from the IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society (Ferroelectrics section). In 2014 he received the Outstanding Young Engineer Award and in 2019 he received the "Tatsuo Itoh" Award both from the IEEE Microwave Theory and Techniques Society (MTT-S). His students have received numerous student paper/competition awards and research-based scholarships. Professor Peroulis has been inducted into the Book of Great Teachers at Purdue University and has received 10 teaching awards including the 2010 Charles B. Murphy award, which is Purdue University's highest undergraduate teaching honor.