

Session 20 Overview: *High-Performance VCOs*

RF SUBCOMMITTEE



Session Chair:
Andrea Bevilacqua
University of Padova, Padova, Italy



Session Co-Chair:
Salvatore Levantino
Politecnico di Milano, Milan, Italy



Session Moderator:
Hua Wang
Georgia Tech, Atlanta, GA

The quest for voltage-controlled oscillators (VCOs) with lower phase noise and higher efficiency continues. In this session, the first paper describes a technique to obtain a wideband common-mode resonance and minimize the $1/f$ noise upconversion into phase noise in a broadband fashion. Next, a distributed multi-core oscillator, which achieves very low phase noise and an improved FoM with respect to the state-of-the-art of multi-core oscillators, is presented. The final paper showcases a quad-core millimeter-wave oscillator with low phase noise.

8:30 AM

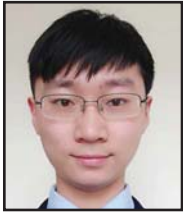


20.1 A 5.0-to-6.36GHz Wideband-Harmonic-Shaping VCO Achieving 196.9dBc/Hz Peak FoM and 90-to-180kHz $1/f^3$ PN Corner Without Harmonic Tuning

Hao Guo, University of Macau, Macau, China

In Paper 20.1, the University of Macau presents a 5.0-to-6.36GHz VCO in 65nm CMOS with a wideband common-mode resonance, achieving a peak FoM of 196.9dBc/Hz at 10MHz offset from the 6.36GHz carrier and the minimum phase noise of -146.1dBc/Hz.

8:38 AM



20.2 A 3.09-to-4.04GHz Distributed-Boosting and Harmonic-Impedance-Expanding Multi-Core Oscillator with -138.9dBc/Hz at 1MHz Offset and 195.1dBc/Hz FoM

Yiyang Shu, University of Electronic Science and Technology of China, Chengdu, China

In Paper 20.2, the University of Electronic Science and Technology of China and Zhejiang University present a distributed multi-core oscillator in 40nm CMOS with a 26.6% tuning range and a minimum phase noise of -138.9dBc/Hz and an FoM of 195.1dBc/Hz at 1MHz offset from the 3.09GHz carrier.

8:46 AM



20.3 A 60GHz 186.5dBc/Hz FoM Quad-Core Fundamental VCO Using Circular Triple-Coupled Transformer with No Mode Ambiguity in 65nm CMOS

Haikun Jia, Tsinghua University, Beijing, China

In Paper 20.3, Tsinghua University presents a triple-coupled-transformer quad-core VCO that is suitable for mm-wave operation. The VCO prototype in 65nm CMOS exhibits a -104.7dBc/Hz phase noise at 1MHz offset from the 59.12GHz carrier and a 186.5dBc/Hz FoM.