International Journal of Antennas and Propagation

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Special Issue on

New Technologies, Systems, and Structures for the Propagation and Manipulation of Electromagnetic Waves

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For as long as humans have harnessed electromagnetic principles in the service of moving data around, there has been a steady stream of breakthroughs in making the transfer of information faster, more accurate, and more efficient. The field of analog signal processing has been a hot research topic for nearly a century and continues to present opportunities for research. The use of dispersion-engineered artificial electromagnetic structures has recently emerged as a new paradigm for controlling and engineering electromagnetic waves in real time. Providing ultrafast signal processing capability with high power efficiency in large-bandwidth operation regimes, analog signal processing is proving to be an attractive approach for analog computation when compared to its digital counterparts. With recent exciting advancements in metamaterials, as well as rich tools and techniques adapted from ultrafast optical processing and other related areas, the field of analog processing is emerging as a novel unifying paradigm to process signals from microwaves all the way up to optical regime, including the burgeoning THz field in between.

This special issue is focused on this new paradigm, its fundamentals, its application to microwave, and mm-wave systems with potential directions in futuristic THz systems and devices.

Potential topics include but are not limited to the following:

- Foundations for analog signal processing (ASP): dispersion engineering, electromagnetic bandgap theory, periodic structures, inverse scattering, metamaterials, metasurfaces, antennas, leaky waves, frequency selective surfaces, magnitude and phase control, propagation, reflection, microwaves, millimeter-waves, terahertz, and optics
- ASP components: frequency-dependent group delay devices, phasers, leaky-wave antennas, slot-array antennas, dispersive delay structures, chirping components, and ad hoc synthesized filters
- Tunable ASP components: acoustic, ferrite, ferroelectric, thermal, micro- and nanostructured materials, MEMS, and active and phase-change materials
- Technologies and system applications in ASP: real-time Fourier transform system, tunable pulse delay system, true-time delayers, real-time integrator system, real-time differentiator system, pulse shapers, wave transformers, and spectrum sniffer
- New technologies and innovative systems in ASP: 5G and beyond, ultra-wide band, microwave technologies and systems, millimeter-wave technologies and systems, THz technologies and systems, and optical technologies and systems

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