Metamaterial Structures for Advanced Sensing and Information Processing

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Metamaterials are artificial materials with properties that go well beyond those offered in natural materials, providing unprecedented opportunities to tailor and enhance the control of waves. In this talk, I discuss our recent activity in electromagnetics, optics and acoustics to show how suitably tailored metamaterial structures and their arrays can open exciting venues for sensing and information processing. I will discuss our work on non-invasive sensing using metasurface cloaks, e.g., [1-2], the role of parity-time symmetry in enabling efficient sensors that go beyond the limitations of passive systems, e.g., [3-4], and nonlocal metasurfaces that can process impinging signals in the analog domain to realize intelligent surfaces for efficient information processing and routing, e.g., [5-6]. Physical insights into the underlying phenomena, and new technology and devices based on these concepts will be presented and discussed.

References


