

Software-defined reconfigurable metasurfaces for programmable wireless environments

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Abstract

Programmable reconfigurable metasurfaces are expected to constitute a key element in the future programmable wireless environments. Here we discuss the design and fabrication of a programmable, reconfigurable and multifunctional metasurface able to operate as all-angle perfect absorber, beam steering and beam focusing device, accounting also for all aspects imposed by the programmability incorporation.

Reconfigurable intelligent metasurfaces are a subject of intensively increasing investigation in recent years, as they are associated with great potential in the realization of advanced wireless environments, important for 5G and beyond wireless communications. A key feature in such environments can be the programmability, i.e. the ability to dynamically control the wave propagation via software. To this extend software-defined metasurfaces, i.e. metasurfaces with multifunctional, reconfigurable response controllable (dynamically) via a software, are associated with unique potential. In this talk we will report our efforts to realize such a programmable reconfigurable metasurface. Our designed and fabricated metasurface is able to act as all-angle perfect absorber, beam steering and beam focusing device, being also compliant with all the practical restrictions imposed by the programmability incorporation. The reconfiguration of the metasurface is achieved via integrated circuits acting as varactor-varistor elements, able to offer local control and a continuously tunable impedance [1-3].

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