

Wireless Communications and Intelligent Sensing Based on Information Metasurfaces

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We proposed the concepts of digital coding metasurface, in which the meta-atoms are represented by using digital states of phases. The digital representation of metasurface makes it possible to manipulate the electromagnetic waves and digital information simultaneously on the same platform, evolving a new direction of information metasurface. The information metasurface sets up a bridge between the physical world and the digital world. Integrated with field programmable gate array (FPGA), the information metasurface can control the electromagnetic waves and process the digital information in programmable ways. By integrating artificial intelligence algorithms in FPGA, the information metasurface can perform intelligent tasks, yielding intelligent metasurface. In this talk, I will present some recent advances on the information metasurfaces, including wireless communications and intelligent sensing based on the information metasurfaces and intelligent metasurfaces.

Biography

Tie Jun Cui is the Chief Professor of Southeast University, Nanjing, China. He proposed the concepts of digital coding and programmable metamaterials and realized their first prototypes, based on which he further proposed information metamaterials to bridge the physical world and digital world, and developed the new architecture information systems. Dr. Cui has published over 500 peer-review journal papers, which have been cited by more than 48000 times (H-Factor 111), and licensed over 150 patents. Dr. Cui received the Natural Science Award (first class) from the Ministry of Education, China, in 2011, the National Natural Science Awards of China (second class, twice), in 2014 and 2018, and the Highly Cited Researcher Awards from Web of Science (top 1%), in 2019-2021, respectively. His researches have been widely reported by Nature News, MIT Technology Review, Scientific American, Discover, New Scientists, etc.

Dr. Cui is the Academician of Chinese Academy of Science and IEEE Fellow. He served as Associate Editor of IEEE Transactions on Geoscience and Remote Sensing, and Guest Editors of Science China, Science Bulletin, IEEE Transactions on Microwave Theory and Techniques, IEEE Journal of Emerging Technologies in Circuits and System, Applied Physics Letters, Engineering, and Research. Currently he is the Chief

Editor of Metamaterial Short Books in Cambridge University Press, the Editor of Materials Today Electronics, the Associate Editor of Research, and the Editorial Board Members of National Science Review, eLight, PhotoniX, Advanced Optical Materials, Small Structure, Advanced Photonics Research, and Journal of Physics: Photonics. He presented more than 100 Keynote and Plenary Talks in Academic Conferences, Symposiums, or Workshops.

