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Editorial: Plasmonic metamaterials and electromagnetic devices volume 2

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Editorial on the Research Topic
Plasmonic metamaterials and electromagnetic devices volume 2

Electromagnetic devices are used as an important component of communication techniques, such as satellite communication, cellular communication and wireless communication. In the past decade, electromagnetic devices have experienced substantial progress for various emerging applications. The development of electromagnetic devices for high performance, compact size, low-consumption and low-cost systems such as filters, and antennas are urgent. The goal of the Research Topic would like to address several recent developments and applications of electromagnetic technologies.

In recent years, balanced circuits are widely used due to their ability of noise suppression and low electromagnetic interference. Especially, the balanced bandpass filters (BPFs) have attached much attention recently. Although a number of designs have been mentioned in previous, they are limited to dual-band case and cannot meet the multiband requirement in the multi-standard wireless system. Li et al. proposed a balanced tri-band SIW BPF with high selectivity based on substrate integrated waveguide (SIW) technology. In this case, the tri-band filtering response and high selectivity can be achieved simultaneously. Meanwhile, the flexible DM transmission and CM rejection characteristics are obtained, which are helpful to micro- and millimeter-wave multi-standard application.

With the merits of enhancing the channel capacity and spectrum efficiency, the technology of multiple-input multiple-output (MIMO) can be a good candidate for realizing a high date rate of fifth-generation (5G) communication. Because of the limited space of a terminal remaining for the antenna, it is difficult to establish a MIMO antenna with wide bandwidth and high isolation simultaneously. Chen et al. designed a broadband MIMO antenna with high isolation. In this design, an offset T-shaped slot is inserted into the ground to achieve large isolation. Meanwhile, the T-shaped slot helps to expand the impedance

bandwidth. In addition, a wide band is achieved for the antenna pair by adding double L-shaped stubs. These good performances open up a new way to improve MIMO antennas in smartphones.

In parallel to communication systems, electromagnetic devices also play a vital role in many fields such as radar and security equipment. Due to the power capacity limitation of the rotary joint, mechanical scanning radars are limited to use high-power microwave sources to improve their performance furthermore. Zhang et al. introduced an over-mode circular waveguide rotary joint with radial mutations at the rotation point to solve this problem. The structure is optimized to suppress unwanted modes. By connecting the choke slot and the rotating part, the breakdown risks of the rotary joint can be reduced. In addition, the choke structure is connected to the inner wall of the waveguide with a gap, the normal modes inside the waveguide will not be affected by the breakdown.

This Research Topic contains three articles devoted to the recent progress in electromagnetic devices. Much more efforts are still ongoing in this fascinating area. We expect that this field will attract more and more attentions and benefit potential electromagnetic applications.

Author contributions

All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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