Editorial

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Editorial on special issue “Metamaterials and Plasmonics in Asia”

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The special issue “*Metamaterials and Plasmonics in Asia*” was developed from the A3 Metamaterials Forum, an annual research meeting first established in 2016, but also includes other specially invited papers.

Since the first published report on negative refractive index by Prof. Victor Veselago in the Soviet Union, the experimental demonstration of negative index materials in the microwave region by Dr. David Smith in the USA, and the high-resolution imaging application by Prof. John Pendry in the UK, research on metamaterials has exploded in different academic fields. In the early stages of metamaterials research, most of the research activity took place in the USA, the UK and Europe, whilst in Asia it was scarce and rather scattered.

Although science is certainly not limited by national borders, it is important to hold regional meetings – especially in Asia – to create a more cohesive and collaborative environment on the continent, enabling young scientists to be easily introduced into the local Metamaterials and Plasmonics community and create a platform for collaborative research.

During the *Metamaterials 2010* Conference in Karlsruhe, Germany, the late Prof. Masanori Hangyo (Osaka University, Japan) and Prof. Jeong Weon Wu (Ewha Womans University, Korea) conceived the idea of a joint Korea-Japan organized Metamaterials Forum. This first *Korea-Japan Metamaterials Forum* was organised in Seoul, Korea. Sadly, Prof. Hangyo passed away in 2014, and Prof. Teruya Ishihara (Tohoku University) took over as Japanese co-chair at that point. In 2016, the *Metamaterials Forum* expanded geographically to include China, with Prof. Lei Zhou (Fudan University, China) as Chinese co-chair and the forum was renamed to “*A3 Metamaterials Forum*”.

This special issue holds a plethora of research topics in metamaterials and plasmonics and includes 30 original research articles and six review articles. Of these 36 articles, nineteen contributions originate from China (including one from Hong Kong SAR), six from Korea, five from Singapore, four from Japan, and two from Australia.

The papers in this issue cover a variety of topics. The review articles lean towards the applications of metamaterials and plasmonics, such as MEMS tuning by subwavelength geometries [1], nano-spectroscopy and nano-imaging [2], plasmon-enhancement of organic and perovskite solar cells [3], plasmonic nanostructures integrated devices [4], broadband metamaterial device [5], and chip-scale spectrometers [6].

The research papers can be categorized as:

- (1) Plasmons (six): particle simulation of plasmons [7], plasmonic nanocavity [8], directional router [9], surface plasmon mode [10], Cherenkov radiation [11], and plasmonic stereo-metamolecule [12]
- (2) Transformation optics (two): [13, 14]
- (3) Pancharatnam–Berry phase and optical angular momentum (five): [15–19]
- (4) Topological photonics (three): [20–22]
- (5) Nonlinear interactions (two): plasmonic laser [23] and second-harmonic generations [24]
- (6) Fano resonance (one): [25]
- (7) Photonic chaos (one): [26]
- (8) Various functional devices (ten): optical filter [27], CMOS [28], metalens [29], hybrid metasurface [30], sensor [31], optical trapping [32], photodetector [33], asymmetric transmission [34], structural colors [35], and metagrating [36].

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Device-oriented research is presented in a large number of the articles in this special issue, which indicates that meta-materials research in Asia is mostly orientated towards practical applications in nanophotonics.

We would like to sincerely thank all of the authors who contributed to this special issue. Most of these authors had to stay self-quarantined at home whilst writing and revising their manuscripts during the COVID-19 pandemic. The outcome of this special issue commemorates the challenges of these times and reflects how viruses spread throughout the world, knowing no borders. It also highlights how science can unite us, as we see scientists from every continent join forces to battle this pandemic by sharing their research results.

We believe that this special issue provides a good overview of research activities by leading scientists in the field of metamaterials and plasmonics in Asia and we hope that you enjoy reading it.

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