IEEE AWPL Special Cluster 2025 on
"Electromagnetic Scattering Technologies for Smart Environments and Internet of Things (IoT)"

Smart environments and IoT will play a transformative role in the future of wireless communication, reshaping societies and driving global economic growth. Flexible and diverse electromagnetic scattering technologies are essential for building the wireless sensor networks that underpin smart environments and IoT. These technologies enable sensing, monitoring, and communication, with critical applications in smart cities, transportation, factories, energy management, and environmental protection. The next generation of wireless communication envisions the widespread use of numerous sensors and devices, often referred to as the "Internet of Everything." To meet sustainable development goals (SDGs), there is a growing need to develop battery-free devices that utilize backscattering for communication and wireless power transfer. Electromagnetic scattering technology will be crucial in this evolution. By optimizing electromagnetic scattering characteristics, it will be possible to achieve high-speed data transmission, reliable wireless connections, and environmentally sustainable, green communication systems.

The objective of this special cluster is to collect the recent advancements in this field and provide an overview of the potentialities of this technology in antenna systems. Contributions are sought for, but not limited to, the following:

- New models and analysis theories of electromagnetic scattering for smart environments and IoT
- Artificial intelligence-based smart beamforming and optimization algorithms
- Low-cost and low-power consumption antenna electromagnetic scattering control for smart environments and IoT
- Novel electromagnetic scattering control methods for reliable high-speed communication
- Scattering control approaches for ultra-wideband array antennas applied in smart environments and IoT
- New testing methodologies for electromagnetic scattering characteristics of antennas
- System models of the communication links including the physical layer devices
- New electromagnetic materials applied in smart environments and IoT
- Electromagnetic wave propagation and dynamic channel modelling for IoT
- New applications of electromagnetic scattering technologies in smart cities, transportation, factories, etc

The Guest Editors of this Special Cluster are:

- Prof. Wen Jiang, Xidian University, China, jw13@vip.qq.com
- Prof. Shuai Zhang, Aalborg University, Demark, sz@es.aau.dk
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Prospective authors are encouraged to contact the Guest Editors for any questions or to determine the suitability of their contribution for this special cluster. Papers should be prepared following the same submission instructions as for regular IEEE AWPL manuscripts (four-pages technical content maximum and one reference page, double-column, IEEE format), available via the Information for Authors website (http://awpl.ee.cuhk.edu.hk/resources.html). The authors should indicate in the cover letter to the Editor-in-Chief that the manuscript is being submitted in response to the Call for Papers for the focused cluster. Prospective authors should refer to the timeline below for key dates.

Key dates:

- Submission deadline: **March 31, 2025**
- First decision: May 15, 2025
- Revised manuscripts deadline: June 15, 2025
- Final decision: July 30, 2025
- Final manuscripts due by: September 1, 2025
- Online publication: Shortly after final manuscript submission
- Cluster publication: November (or December) 2025 issue of AWPL