SPEAKER:

Oscar Quevedo-Teruel is a Senior Member of the IEEE. He received his degree in Telecommunication Engineering from Carlos III University of Madrid Spain in 2005, part of which was done at Chalmers University of Technology in Gothenburg, Sweden. He obtained his PhD from Carlos III University of Madrid in 2010 and was then invited as a postdoctoral researcher at the University of Delft (The Netherlands). From 2010-2011, Dr. Quevedo-Teruel joined the Department of Theoretical Physics of Condensed Matter at Universidad Autonoma de Madrid as a research fellow, and went on to continue his postdoctoral research at Queen Mary University of London from 2011-2013.

In 2014, he joined the Electromagnetic Engineering Division, in the School of Electrical Engineering and Computer Science at KTH Royal Institute of Technology in Stockholm, Sweden where he is an Associate Professor and director of the Master Programme in Electromagnetics Fusion and Space Engineering. He is an Associate Editor of the IEEE Transactions on Antennas and Propagation since 2018, and he is the delegate of EurAAP for Sweden, Norway and Iceland for the period 2018-2020. He is a distinguished lecturer of the IEEE Antennas and Propagation Society for the period 2019-2021.

He was the recipient of the Award of Excellence in 2010 from Carlos III University of Madrid. In 2010, he also received the National Award of Arquimedes for the best supervisory of a student project in Engineering and Architecture throughout Spain.

He has made scientific contributions to higher symmetries (glide and twist), transformation optics, lens antennas, metasurfaces, leaky wave antennas, multi-mode microstrip patch antennas and high impedance surfaces. He is the co-author of more than 60 papers in international journals, more than 120 at international conferences and has received approval on 2 patents.

TALK:

Title: Higher symmetries: a new degree of freedom for the design of periodic structures

Abstract:

Higher symmetries were employed for electromagnetic purposes during the 60s and 70s. Those works were focused on one-dimensional structures with potential application in low-dispersive leaky wave antennas. However, the development of planar/printed technologies in the 80s and 90s associated to their low-cost for low-frequency applications, the studies of higher symmetries stopped.

Fig.1: 1D glide- (left) and twist- (right) symmetric geometries.

In the beginning of the 21st century, with arrival of metamaterials, there was a significant development of the understanding of periodic structures, and new methods of analysis were introduced. This theoretical development, together with the interest of industry in mm-waves, particularly for communications systems such as 5G, created an opportunity to explore the possibilities of higher symmetries, especially in two-dimensional configurations.

Higher-symmetric structures has recently attracted the attention of researchers due to their attractive properties for practical applications. Among their interesting properties are low-dispersive responses in fully metallic structures such as parallel plate or co-planar waveguides (CPW), bandgaps associated to the symmetries and large electromagnetic bandgaps (EBGs).

In this talk, Dr. Quevedo-Teruel will describe the most significant works in higher symmetries, including their application for the design of gap-waveguide technology and planar lens antennas with steerable angles of radiation.