

Numerical Analysis of Nano Structures in Layered Media

10:00 AM Friday, November 14, 2014
Engineering Meeting Room (2nd Floor)
Dr. Aytac Alparslan

Layered media are one of the most important building blocks in electromagnetics, regardless of the wavelength range. In the microwave regime, layered media and their salient physical and mathematical properties are used extensively when building devices such as antennas, transmission lines and waveguides. Following the improvements in the fabrication of structures having geometrical features comparable with the visible spectrum, several nano devices built in layered media are realized and became the new hot topics of the electromagnetic society, including optical antennas, bio-chemical sensors, plasmonic waveguides, etc. As a result of this interest, it has been quite important and desirable to have a robust and efficient numerical method that can analyze nano-optical structures in layered media. For this purpose, layered media Green's functions that are used in the analysis of structures in the microwave range for decades is updated (by introducing the dispersive and plasmonic nature of metals in optics) and combined with the Multiple Multipole Program (MMP). In this talk, this method will be reviewed and its advantages over other popular numerical methods will be demonstrated by demanding numerical examples.

Dr. Aytac Alparslan received the B.S. and M.S. degrees in Electrical and Electronic Engineering from Koç University, Istanbul, Turkey in 2006 and 2008, respectively and the PhD degree in Information Technologies and Electrical Engineering from ETH Zürich, Switzerland in 2013. Upon graduation, he worked as a postdoctoral research fellow at the Computational Optics Group of ETH Zürich. His research interests include Computational Electromagnetics, Metamaterials, Photonic-bandgap Structures and Nano-optics, on which he authored a book and more than 20 peer-reviewed journal and conference publications. Dr. Alparslan was the recipient of Undergraduate Scholarship presented by the IEEE Microwave Theory and Techniques Society (MTT-S) and the IEEE Antennas and Propagation Society (AP-S) in 2005. He was also a recipient of the TÜBİTAK Graduate Scholarship in 2006-2008 and the PhD scholarship of Swiss National Science Foundation (SNSF) in 2008-2014.

