Short Report on My Participation in
Metamaterials: The 13th International Congress on Artificial Material for Novel Wave Phenomena in Rome, 16-21 September 2019.

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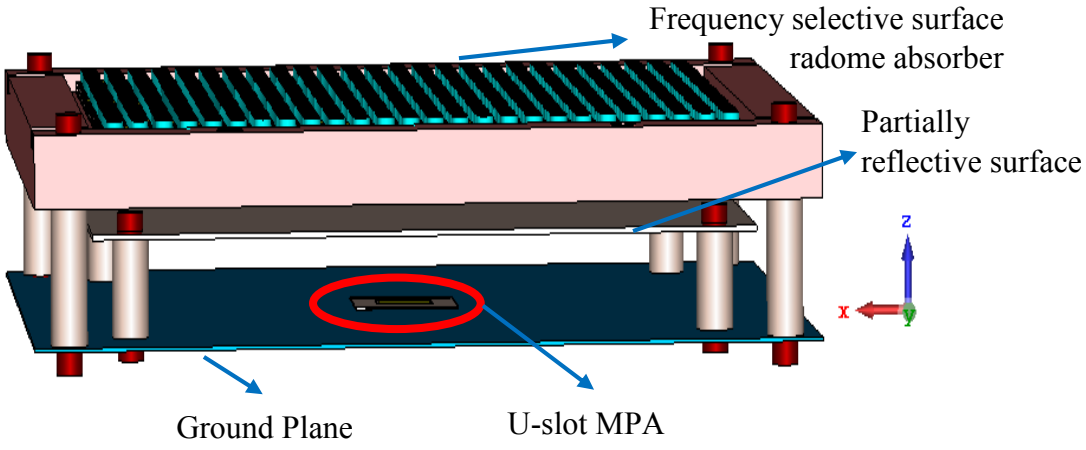
My Journey to Participate in the Metamaterials Congress 2019 Rome, Italy

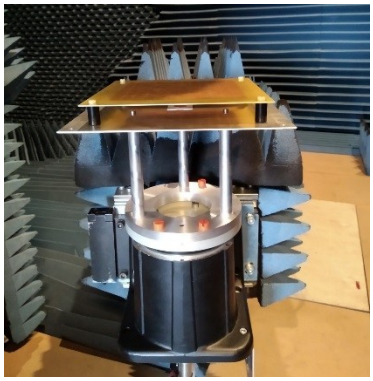
Having finished my internship with the topic of "Integration of a Planar Radome Absorber onto a Planar High Gain Antenna" at IHF, I wrote a paper to the Metamaterials 2019 conference. This conference covers both theory and application of metamaterials, topics where I found very interesting. I submitted my paper in March and in May, the committees accepted my paper for oral presentation and included the paper into the *antenna and absorber applications* session.

My internship project (and also my paper) is based on the previous work, on the development of frequency selective surface radome absorber, which has been fabricated and measured at IHF. My focus is to design antennas with high gain, planar and compact and then integrate it with the existing radome absorber. RCA is chosen since it has a large ground plane. The role of the radome absorber is to reduce the antenna scattering (in the receiving mode) at higher frequencies, without degrading the antenna performance.

The FSS radome absorber is transparent (low losses) in C-band range frequency. At frequencies below the C-band, it is reflective. At frequencies higher than the C-band, it is absorptive. My main work is to investigate the antenna performance before and after the integration. I found that the performance of the antenna, with and without the FSS radome absorber is relatively similar. The insertion of the FSS radome absorber does not degrade the antenna.



The layout of the antenna and radome integration



The antenna (with and without the radome absorber) in the chamber

On September 15th 2019 evening after the re-registration, there was a 'Hands-On Session' held by Photon Design using Omnisim software. In the workshop, participants were also given the opportunity to try new features in the Omnisim software, which is based on the Finite Element Time Domain method. These features are ideal for metamaterials modeling.

I presented my paper on September 16th, 2019, on the first day of the conference. It is in the *antenna and absorber applications* (part 1) session. I enjoyed the environment during the conference. Moreover, I could discuss with people who are more expert in the field of metamaterial theory and application. I also gained new knowledge related to the application of metamaterial in the fields of health, antenna and daily life.

Many new experiences and knowledge are obtained during this conference. I met people with different research fields and discussed with people from different educational and cultural backgrounds. In addition, I also enjoy the beauty of the city of Rome with the many historic buildings scattered in the city, plus the Vatican City which is the smallest independent country in the world.

I am very grateful to Prof. Dr.-Ing. Dirk Heberling for giving me the opportunity to do the internship at IHF, as well as Sofian Hamid M.Sc and Asst. Prof. Dr.-Ing. Suramate Chalermwisutkul for the guidance and supervision of my project. Also, thanks to the *Verein zur Förderung der Hochfrequenztechnik in Aachen e. V* for the financial support in the Metamaterials Conference registration.

The proceeding of the conference can be download through

http://congress2019.metamorphose-vi.org/proceedings2019

or, Quick download for tablet and other mobile devices