

Student Project Proposal

Project title: **Design and optimization of segmented loop antennas for micro-tags detection**

Project type: **Bachelor Semester Project** (8 credits) or **Master Semester Project** (10 credits) or

Master Thesis Project (30 credits)

Faculty and Laboratory: STI, Microwaves and Antennas Group (MAG)

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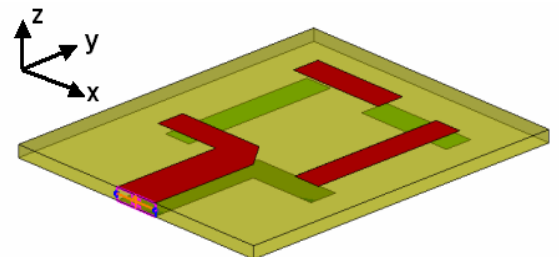
Project description:

Interest in implantable sensors is increasing more and more in the last decades, especially in the frame of medical applications. These sensors are used to measure some bio-data (e.g. temperature, pressure, glucose level) and transmit them out of the host body. The communication between the implanted sensor and the device placed out of the body needs to overcome some challenges which increase the difficulty of the antennas design in both parts of the system, implanted device and out of the body device (also known as reader).

In the frame of this project, we will consider extremely miniaturized implants, tags designed to be implanted in cells (scale of micrometres). These tags are made of a resonator and an antenna, and should be detected by a reader placed just outside the host body. Due to the space limitation in the side of the implant, the major complexity of the system will be focus on the reader. Based on that, the objective of the current project is to study and optimize a segmented loop antenna to use in the reader side. Segmented loop antennas allow large loops to behave as small loop antennas generating a constant magnetic field in its vicinities. With the aim of maximizing the constant magnetic field region different parameters of the antenna need to be analysed: shape, segments dimensions, substrate characteristics, work frequency, etc.

Student tasks:

- Learn how to desing a segmented loop antenna.
- Study the effect of changing different parameters of segmented loop antennas to optimize its performance.
- Design the optimized segmented loop antenna.



[1] Hasse, Roger & Demir, Veysel & Hunsicker, W & Kajfez, Darko & Elsherbeni, Atef. (2008). Design and Analysis of Partitioned Square Loop Antennas. Applied Computational Electromagnetics Society Journal. 23.