EE/CprE/SE 492 WEEKLY REPORT 3

March 13th – March 24th

Group number: 29

Project title: Building Blocks and Sub-Circuits with Magnetic Field Generators

Client &/Advisor: Robert Bouda, Wei Shen Theh, Mani Mina

Team Members/Role:

Andrew Murphy - Circuit Design, Simulation and Testing
Steven Huynh - Circuit Design, Simulation and Testing
William Nichols - CST Waveguide and Coupler Models Designer
Michael Lopez - Matlab/Simulink Mach-Zehnder Model Designer
Umair Sarwar - Inductor coil in Comsol Designer

o **Weekly Summary** For this week, the team members worked on a variety of different goals. The first was to update our circuit design in KiCad and implement the eGAN MOSFET into the ZVS circuit. We plan on ordering the PCB through the ETG by the end of this week. We continued our experimentation of CST as well as COMSOL. For CST, the focus was to develop a simulation for our waveguide. For COMSOL, we calculated the magnetic flux density of a spiral coil. We also continued to integrate a prototype of the Mach-Zehnder simulation in Matlab, we relied on multiple equations and conducted research to successfully accomplish this task.

o **Past week accomplishments**

· Andrew: After conducting physical testing Andrew has gone ahead and designed the circuit onto a PCB board in KiCad. Since the eGAN MOSFET we've chosen doesn't use a standard footprint in KiCad, Andrew created a custom one to fit onto the PCB design.

·Michael Lopez: finished creating general models for the Mach-zehnder with the Magneto-Optic Faraday Rotator and without the Magneto-Optic Faraday Rotator within Simulink. Research into multiple methods on configuring the effects of the Faraday Rotator in Simulink to get the desired outcome.

·William Nichols: Studied methods of configuring waveguides into CST so it can be modified to various purposes for an actual waveguide.

·Umair Sarwar: Studied in computing ways for the magnetic density of a spiral for future integrations into coil design.

o **Pending issues** *(If applicable: Were there any unexpected complications? Please elaborate.)*
- William: Unable to solve some problems in CST. Unable to get both the upper and lower frequency bounds in the waveguide to be the same. Both bounds seem to change without any input, and are unsure about how to change it.

- Michael Lopez: The output waves from the simulation do not match what is currently being expected within both models of the Mach Zehnder. Goes against research and computations made for the Mach Zehnder.
- Steven: Awaiting PCB board to start building the product. PCB should be ordered by the end of this week, and it'll take about a week or so to be delivered.

o **Individual contributions**

NAME	Individual Contributions *(Quick list of contributions. This should be short.)*	Hours this week	HOURS cumulative
Andrew Murphy	Create KiCad footprint, Update KiCad PCB designs.	14	98
William Nichols	Studied Waveguide design and started working on creating a Mach-Zehnder loop in CST.	19	89
Michael Lopez	Creating a Mach-Zehnder Optical Simulation within MATLAB/Simulink	13	123
Steven Huynh	Assisting in KiCad PCB design, Researching Compatible parts for physical testings	6	59
Umair Sarwar	Created Spiral Coil within COMSOL using 2D Model and attempting to verify magnetic flux density by hand.	4	62

o **Plans for the upcoming week** *(Please describe duties for the upcoming week for each member. What is(are) the task(s)? Who will contribute to it? Be as concise as possible.)*
- Andrew and Steven: Solder components to PCB once it's delivered at the ETG.
- Michael Lopez: Finish Implementing the Mach-Zehnder with the Magneto-Optic Faraday Rotator

- William Nichols: Worked on a Waveguide and Mach-Zehnder loop in CST.
- Umair, William, Michael: Meet with Robert Bouda(client) one on one to discuss the various programs that are being used for the project so that both parties can get a better understanding.