

# Optimization of a Delta-T Device

## Thesis (f/m/d)

### What we do:

At MAGNOTHERM, we are developing a **revolutionary refrigeration technology** based on magnetic materials. Our vision is to provide the **cleanest and most sophisticated** cooling and heating solutions for everybody to reduce climate impact and costs. We are able to reduce 40% of energy demands and **eliminate 100% of direct greenhouse gas emissions** from cooling and heating appliances. Founded in 2019, our start-up is a spin-off from Technical University of Darmstadt. We have developed a **patented material technology** to make magnetic refrigeration effective and affordable. This enables us to build the most superior refrigeration systems for commercial and industrial applications. We are currently revolutionizing and challenging **commercial refrigeration systems** for room-temperature and ultra-low temperature applications.

### Goal of the Thesis:

In order to utilize magneto caloric materials in magnetic cooling devices it is necessary to know the actual properties to a decent level. Therefore MAGNOTHERM has developed and built an inhouse Delta-T measurement device. This device measures the temperature change of materials in a magnetic field as a function of the start temperature. However, this device does not reach the aimed accuracy and usability. The goal of the Thesis is to investigate current shortcomings and enhance the current setup. Furthermore, the properties of different probes will be investigated.

### Who we are:

We are material scientists, chemists, physicists (and so on...), a lot of engineers, and product as well as graphic designers. We are a young and up-and-coming team of bright minds with diverse backgrounds. We love playing Wordle during lock down and drink beer together, if Covid lets us. We argue about social injustice, the latest computer games, and food trends. Basically, we are pretty human.

### Why you should join us:

We believe in science; we believe in the facts. Climate change is speeding up more than ever and we need to do something about it. We are convinced that we need better technologies in order to overcome this tremendous challenge – or more precisely: this tremendous threat to humanity.

We are on a mission to decarbonize the refrigeration industry and reduce the 8% overall emissions caused by the 5 billion cooling devices currently deployed.

We are looking for a motivated and dedicated bachelor's or master's student who wants to work on a scientific topic in an inspiring team.

### What you will be doing here:

1. You will investigate the current sources of error of the device and implement ways to reduce these errors.
2. You will optimize the current design and enhance the usability of the device.
3. You will characterize the temperature change of magnetocaloric materials
4. You will evaluate and manage data

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5. You will help us test magnetically cooled drinks.

### **What you would ideally bring to the table:**

1. You have a background in physics, material science, mechanical engineering, electrical engineering, computer science or similar.
2. You are currently pursuing a bachelor's or master's degree.
3. You have a basic knowledge in data evaluation.
4. Ideally you have basic programming skills. Ideally in Python and C++ (Arduino Framework)
5. Ideally you have used Fusion360 or another CAD-tool before.
6. You are motivated to work in an interdisciplinary subject with a reliable and independent work ethos.
7. Your English skills are better than "only understanding train station".

### **What you will get from this Thesis:**

1. The opportunity to work in our HQ in Darmstadt or from home.
2. You will be part of an extraordinary team of bright minds with diverse and international backgrounds working on the forefront of climate tech.
3. This is the chance for you to take responsibility and grow as a person in an environment, where mistakes are embraced in order to learn faster.
4. Lots of humorous memes.

### **What you should do now:**

1. Send us your CV to [benke@magnotherm.com](mailto:benke@magnotherm.com), [wochner@magnotherm.com](mailto:wochner@magnotherm.com) and [jobs@magnotherm.com](mailto:jobs@magnotherm.com) (no pictures, names, birthdates needed in there).
2. If available share a link or a short description of a reference project in the email.