

## Understanding potentially magnetic nanoparticles

**Aerosol physics is a key field of interest for scientific research. It covers a range of important scientific areas on the scale of the planets atmospheric conditions to the use of nanoparticles to treat cancer. Nanoparticles have incredible potential to change the lives of humans throughout the world.**

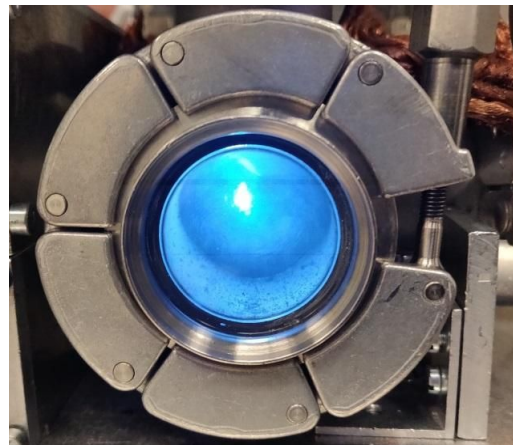
Nanoscience and technology is an evolving field of research that has the potential to change the lives of people all around the world. Nanotechnology describes structures such as nanoparticles on the scale of a nanometer which is one billionth of a meter, a size comparable to that of atoms. Nanoparticles of this size are interesting because they gain properties that are otherwise impossible for larger objects. Innovations as a result of nanoscience have already been implemented in a number of consumer devices such as in electronics, filtration systems and medical devices. Magnetic nanoparticles are a relatively new tool and can be manipulated in unique ways making them an area of interest with intriguing potentials.

Magnetic nanoparticles are likely to be produced from a combination of elements such as samarium and cobalt. A good method to create nanoparticles from a combination of materials is to have a spark between two metal rods. These rods can be made by pressing together powder of the desired elements into solid metallic rods. The spark between the rods is very hot creating a plasma which cools into nanoparticles which are a mixture of the elements used in the rods. These nanoparticles can be collected to study their shape and understand how they change when using different gases and at different temperatures.

A spark discharge generator is a powerful machine which has an array of components to control the production of particles. The SDG also has a number of tools to help to understand nanoparticles after they have been created.

Nanoparticles, as the name suggests are very small and thus normal light microscope cannot resolve the fine details of the particles. An electron microscope can resolve nanoparticles so a scanning electron microscope is used to understand the shapes of the particles. A transmission electron microscope can penetrate the particles giving information on which materials the nanoparticles are made of.

Magnetic nanoparticles have many exciting applications such as being used to in experimental cancer treatments. Magnetic nanoparticles can be manipulated to parts of the body where the cancer is present and heated up to safely destroy the cancer cells.



Supervisors: **Maria Messing and Calle Preger**

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Physics Department, Lund University

**Timothy Lewis**

Supervisors: **Maria Messing and Calle Preger**

Master Thesis: 30 hp in Physics, May 2019

Physics Department, Lund University