

# Models of Simple Iron Cored Electromagnets

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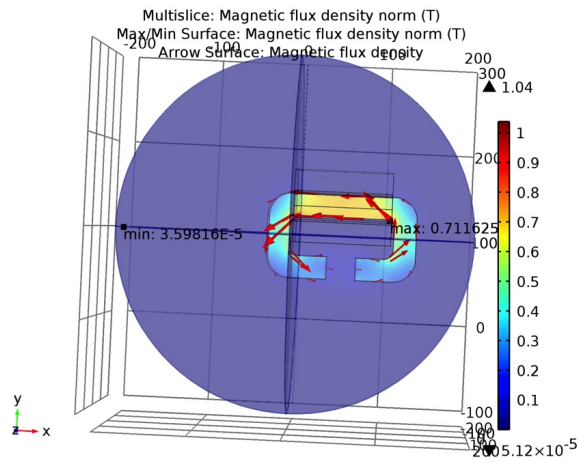
## Abstract

This report mainly discusses the implementation and results of a project proposal, "Modeling using Finite Element Methods". It is a final year project proposed by the School of Computer Science in Manchester University. It covers a brief introduction to modelling and simulation as well as Finite Element Method/Analysis (FEM/A). The main part of the report is devoted to implementation, which is a model of an electromagnet shown in Figure 1. The model is created after doing some experiments and measurements on a real electromagnet. The electromagnet is used in the laboratory (laboratory of IT department) as part of a larger experimental apparatus, where there is a need to create a magnetic field, which can be controlled by changing the current in coils. A typical use would be to measure the magnet-optical response of novel data storage-media such as bit pattern media (BPM). The software tool that is used to model the electromagnet is COMSOL Multiphysics®, a commercial FEA package. Additionally, the report includes other electromagnet models and their comparison with the original model. The additional models are obtained either by making changes on the original model (Figure 3, 4) or by designing new models (Figure 2).

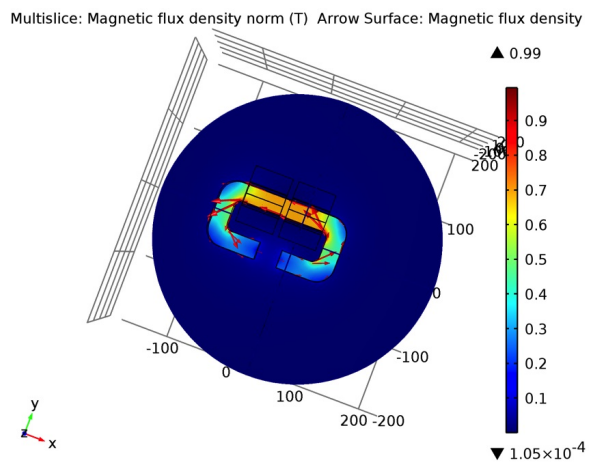
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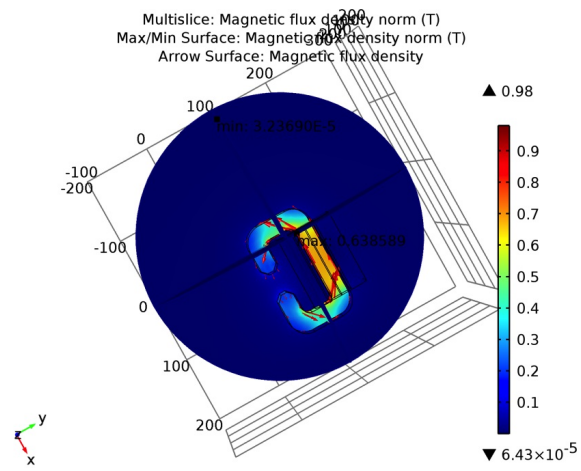
# Figures used in the abstract



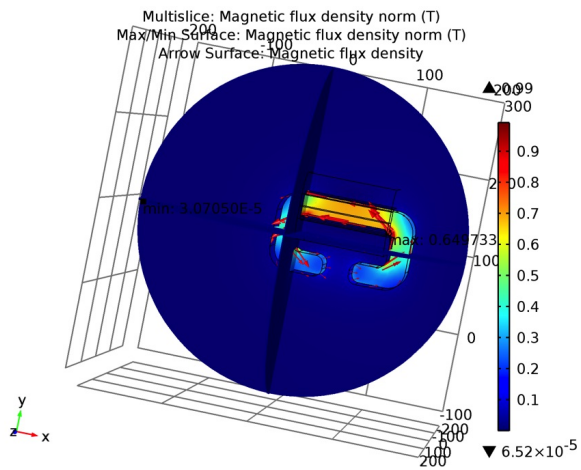
**Figure 1: Base Model**



**Figure 2: Another Model of an electromagnet**



**Figure 3:** A new model obtained by applying some changes to the Base Model.



**Figure 4:** A new model obtained by applying some changes to the Base Model.