Computational micromagnetics with JOOMMF

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Computational micromagnetic studies complement experimental and theoretical studies, and are at times the only feasible way to address research challenges, effective industrial design and engineering of various products and systems. OOMMF [1] is likely the most widely used micromagnetic simulation package. It can be driven through a graphical user interface or through a configuration file (mif-file) that defines the simulation run. In this talk, we present a Python interface to OOMMF that allows driving of OOMMF simulations from a Python program or interpreter prompt. One major advantage of this approach is that the definition and execution of OOMMF simulation runs is embedded in a general purpose programming language [2]. Another advantage is that simulation runs can make full use of the ecosystem of scientific libraries available for Python. For example, design optimisation, specialised post-processing and the creation of figures can all be carried out using a single script. We demonstrate how the standard problems can be solved in a single Python file, using the new Python interface to OOMMF. The code for the Python interface to OOMMF is publicly available and open source. This project is a part of the Jupyter-OOMMF (JOOMMF) [3, 4] activity in the OpenDreamKit [5] project and we acknowledge financial support from Horizon 2020 European Research Infrastructures project (676541). The work is also supported by the EPSRC CDT in Next Generation Computational Modelling EP/L015382/1, and the EPSRC grants EP/M022668/1 and EP/N032128/1.

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[4] http://joommf.github.io

[5] http://opendreamkit.org