PhD position in computational magnetism and artificial intelligence

Climate change and global warming are the greatest threats to be faced by mankind. In order to counteract, a fundamental change in the way we move, transport our goods, and generate and convert energy is required. This includes the development of novel and highly efficient motors, generators, transformers, and power electronic devices which all rely heavily on magnetic materials. However, currently available magnetic materials often do not meet the requirements, are not available in sufficient quantity, or impose heavy environmental burden, making it impossible to achieve the set climate goals. Thus, a radically new paradigm for the discovery and development of magnetic materials is urgently needed to act in time.

The Christian Doppler Laboratory for magnet design through physics informed machine learning addresses these challenges by using artificial intelligence (AI) to design and optimize permanent magnets. In your PhD, you will develop a reduced order model for magnetization reversal of permanent magnets combining micromagnetic simulations and machine learning. This model will be the key building block for materials development through reinforcement learning.

You will work together with material scientists and AI experts from Toyota Motor Corporation. You will gain high level expertise in computational physics and machine learning. You will have access to state-of-the-art hard- and software for massively parallel computation and data science.

The position is full time. The preferred starting date is July 1st, 2021 or earlier. The duration is 3 years. Individual arrangements are possible based on your preferences.

For further details please contact:

thomas.schrefl@donau-uni.ac.at

Opening of the New Christian Doppler Research Laboratory for Magnet Design - Danube University Krems (donau-uni.ac.at)

CD-Labor for Magnetdesign durch physikalisch fundiertes maschinelles Lernen - Christian-Doppler-Gesellschaft: Christian Doppler Forschungsgesellschaft (cdg.ac.at)

Magnetic microstructure machine learning analysis - IOPscience
Exl, L.; Fischbacher, J.; Kovacs, A.; Özelt, H.; Gusenbauer, M.; Yokota, K.; Shoji, T.; Hrkac, G.; Schrefl, T. Magnetic Microstructure Machine Learning Analysis. Journal of Physics: Materials 2018, 2 (1), 014001. https://doi.org/10.1088/2515-7639/aaf26d