

# Understanding X-ray-triggered demagnetisation

Beata Ziaja-Motyka<sup>1</sup>

<sup>1</sup>*CFEL, DESY, Hamburg, Germany and IFJ PAN, Kraków, Poland*

The availability of X-ray free-electron lasers, which can generate high-intensity femtosecond X-ray pulses, has opened up a new field of ultrafast X-ray science that has been developing rapidly since 2005. In particular, these high-intensity radiation can act as a pump, triggering strong excitation of the electronic subsystem of solids on femtosecond timescales. Depending on the absorbed dose, this can trigger various transitions in solids, including ultrafast magnetic transitions. The quest to understand these transitions has stimulated the development of a dedicated theoretical tool called XSPIN, which can describe the evolution of irradiated magnetic samples under initially strongly non-equilibrium conditions. Further model developments and challenges on the way towards controlling X-ray-induced magnetisation are discussed.

## References:

[1] K. J. Kapcia et al., *npj computational materials*, 8 (2022) 212.

*In collaboration with K. J. Kapcia, V. Lipp, V. Tkachenko, F. Capotondi, A. Lichtenstein, S. Molodtsov, P. Piekarczyk*