

# Dynamics of magnetic objects and ultra-fast phase transitions in RhFe

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In the first part we report on progress in measuring and understanding the dynamics of mesoscopic magnetic objects.

These are studied in a scanning transmission x-ray microscope (STXM) which provides information about the space- and time resolved magnetization [1]. We study individual objects, arrays and multilayer samples. The multilayer samples are of particular interest because the coupling between the layers can be tuned from anti-ferromagnetic to ferromagnetic using ion-beam irradiation.

In a second part we present results on the unusual magnetic phase transition in RhFe taking place above room temperature. Here an anti-ferromagnetic low-temperature phase changes to a ferromagnetic high-temperature phase. This phase transition can be initiated using an ultra-fast laser pulse.

We have studied the evolution of the crystal lattice in this transition using a pump-probe scheme. The pump-pulse is a fs laser pulse, the probe pulse is an x-ray pulse (width ~200 fs) produced by laser slicing of the stored electron beam [2]. The data provide quantitative information about the time evolution of the lattice constants and the domain sizes. These data can be compared to optical MOKE data which measure the time dependant magnetization [3].

## References

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