

Fast kinetics in thin films

Wednesday, 26 April 2023 17:30 (30 minutes)

We propose to upgrade and optimize NREX for studying the interaction of hydrogen with surfaces and thin film structures. The main goals of the upgrade are: (i) to increase the sensitivity and time resolution for single shot experiments by one order of magnitude compared to existing neutron techniques, with the aim to detect changes of the hydrogen concentration with a sensitivity better than 1%at. in less than one second. (ii) to improve the time resolution for periodic gating experiments by two orders of magnitude, from currently 1ms to 5 μ s. Technically, the enhanced performance relies on the design of optimized samples with resonator structures, and on fast neutron beam intensity modulation by radio-frequency spin flippers. The performance of the polarization analysis is not affected by this intensity modulation, this means that both the kinetics of the hydrogen concentration and of the magnetization reorientation can be studied simultaneously. The methods are also applicable to other ions and dopants, in particular oxygen and lithium.

Primary author: KELLER, Thomas (MPI for Solid State Research, Stuttgart)

Co-authors: KEIMER, Bernhard; GUASCO, Laura; KHAYDUKOV, Yury

Presenter: KELLER, Thomas (MPI for Solid State Research, Stuttgart)

Session Classification: Large scale structures