Vibrational Density of Phonon States in Thin Fe Films on W(110) Measured by Nuclear Inelastic Scattering of Synchrotron Radiation

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The outstanding properties of 3rd generation synchrotron radiation sources combined with the unique energy resolution provided by the Mössbauer effect makes Nuclear Resonance Scattering of synchrotron radiation a versatile experimental method for probing wide range of phenomena in nanostructured materials [1]. Recently we have installed and commissioned ultrahigh vacuum sample environment in the nuclear resonance beamline ID18 at the ESRF in the frame of DYNASYNC network [2]. This has opened up the possibilities to study dynamics and magnetism in free surface-structured samples. The first experimental results on thickness and orientation dependence of the vibrational density of phonon states of Fe thin films on W(110) in the thickness range between 40 ML and 1 ML will be presented. The results are compared with the density of the phonon states in bulk α-Fe and with recently performed *ab-initio* calculations.

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