

Abstract Submitted
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Time-resolved probing of magnon mass renormalization in epitaxial Fe films VLADIMIR STOICA, CHRISTIAN SCHLEPUETZ, University of Michigan, DONALD WALKO, YUELIN LI, ERIC DUFRESNE, Argonne National Laboratory, ERIC LANDAHL, DePaul University, ROY CLARKE, University of Michigan — Irradiation of ferromagnetic metals with femtosecond laser pulses leads to sub-picosecond ultrafast demagnetization, followed by coherent spin wave dynamics on the picosecond to nanosecond timescales. Presently, it is of high interest to develop a cohesive picture that consistently accounts for these experimental observations. One way to address this is to refine the experimental techniques for improving the quantitative comparison with theory. Here, we present in-detail investigations of the coherent exchange spin waves in epitaxial Fe films, which are used for accurate determination the spin wave stiffness constant, D . These studies enabled to detect the effect of femtosecond laser excitation on D and correlate the results with time-resolved X-ray diffraction measurements of the thermal relaxation. Our data provide evidence for the magnon mass renormalization induced by electron-magnon interaction. Preliminary data obtained in Ni and Co seem to indicate the same effect.

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