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Microwave assisted switching in individual and interacting magnetic nanowires[1] D. GRUNDLER, Physik Department E10, TU Muenchen, 85748 Garching, Germany, D. HEITMANN, J. TOPP, Inst. f. Angew. Physik, Universitaet Hamburg, 20355 Hamburg, Germany — Recent spin dynamics experiments have shown that microwave assisted switching (MAS) occurs if a magnet is excited at large excitation amplitudes, i.e., in the non-linear regime.[1,2] MAS has reduced the coercive fields H_c. We studied the MAS process on arrays of nanopatterned permalloy wires (20 nm thick, 300 nm wide, and 180 μm long) where we varied the edge-to-edge separation d between 100 and 700 nm. MAS was found to reduce H_c resonantly at the quantized center-mode eigenfrequency of the nanowires. MAS also narrowed the distribution of H_c of the nanowires. The efficiency for the MAS process depended on, both, the applied in-plane field and separation d. To model this behavior we considered the effect of dipolar interactions. [3] MAS was most efficient for $d = 100$ nm and reduced H_c by about a factor of two. Our observations are relevant if MAS is considered for encoding information in magnetic bits of high density. [1] J. Podbielski et al., Phys. Rev. Lett. 99, 207202 (2009). [2] G. Woltersdorf et al., Phys. Rev. Lett. 99, 227207 (2009).[3] J. Topp et al., in press.

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