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Enhancement of $L1_0$Order in FePt Thin Films and X-ray Rapid Thermal Annealing (XRTA)[1] ROSA ALEJANDRA LUKASZEW, JONATHAN SKUZA[2], University of Toledo, ERIC DUFRESNE, Argonne National Laboratory, CODRIN CIONCA, University of Michigan, ALFONSO CEBOLLADA, IMM-Spain, CESAR CLAVERO, IMM-Spain, CORA LIND, University of Toledo — Highly ordered $L1_0$ FePt thin films and nano-structures are important for magneto-recording applications because this ordered phase exhibits very large magnetic anisotropy. One possibility to achieve high degree of chemical order in epitaxial, but somewhat chemically disordered films is to perform annealing treatments. One variation of such treatments is rapid thermal annealing (RTA). Here we describe an innovative application of x-ray undulator radiation to simultaneously perform RTA and probe structural changes that occur *during* annealing. In our studies, we have used XRTA to enhance chemical order in epitaxial (001) FePt thin films. We observed the enhancement of the *fcc-fct* transition with 30 ms temporal resolution in Bragg geometry. The results demonstrate that undulator radiation offers unique possibilities for materials processing, particularly the ability to use the *same* beam for heating and probing.

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[2]graduate student and presenter

Rosa Alejandra Lukaszew
University of Toledo

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