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Exotic Single Crystal Thin Films Made From Cobalt Ferrite. H. CORCORAN, Morgan State University, A. COLEMAN, Morgan State University, A. LISFI, Morgan State University, C. M. WILLIAMS, Morgan State University, W. MORGAN, Morgan State University, A. KUMAR, Morgan State University — The search for new magnetic materials is driven by technological demands such as increasing the magnetic recording density. Materials possessing a large magnetic anisotropy are suitable media to meet such requirements since a stable magnetization can be promoted in nano-structures. Hard ferrites such as the hexagonal ($BaFe_{12}O_{19}$) and the cubic ($CoFe_2O_4$) are attractive for such kind of applications due to their large magnetocrystalline anisotropy and high chemical stability. In this talk we report on exotic properties of films made from $CoFe_2O_4$. Epitaxial $CoFe_2O_4$ thin films have been grown by pulsed laser deposition (PLD) on (100) MgO substrate. Two types of spin-reorientation have been observed in such films upon annealing or increasing the film-thickness. In the as-deposited layers and at low thickness the easy axis of the magnetization is confined to the normal to the film plane whereas at large thickness the film plane becomes the preferential direction of the magnetization. On the other hand annealing induces a reorientation of magnetic anisotropy, which switches from the normal to the film plane in the as-deposited film to be in-plane aligned in the annealed state. The origin of both reorientations is explained in term of competition between stress and magnetocrystalline anisotropies.

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