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Magnetic Behavior of Rare Earth Thin Films and Superlattices. Ph. Mangin*, K. Dumesnil+ and C. Dufour+,
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Since the pioneering works of C.F. Majkrzak et al [1] et Salamon et al [2] on Gd/Y and Dy/Y superlattices, a lot of works have been devoted to the magnetic behavior of epitaxial films and superlattices of rare earths. We first summarize the results obtained on a lot of systems exhibiting a large variety of behaviors. Then we present recent results from bcc-europium. Eu thin films exhibit a helical magnetic ordering along the cubic axes [100], [010] (out of the plane of the sample) and [001] (in the plane of the sample), which gives rise to three kinds of magnetic domains D1, D2 and D3 respectively. As the temperature is lowered, two phenomena are observed: i) The wave vectors of the D1 and D2 domains leave the cubic directions and rotate through an angle $\beta(T)$. ii) The D3 domains vanish and are only restored if a critical field $H_c(T)$ is applied along [001]. $\beta(T)$ and $H_c(T)$ are shown to be correlated to the epitaxial strains and we will discuss several mechanisms including magnetoelastic contributions and exchange anisotropy induced by the deformations [3].

[1] C.F. Majkrzak et al. Phys. Rev. Lett. 56,2700(1986), [2] M.B. Salamon et al. Phys. Rev. Lett. 56,259(1986), [3] S. Soriano et al. Phys. Rev. B71, 092409(2005)