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Shifts: 18	Local contact(s): R. Cid Barreno	
Names and affiliations of applicants (* indicates experimentalists): Enrique G. Michel*, Universidad Autónoma de Madrid, Spain Pilar Segovia*, Universidad Autónoma de Madrid, Spain Manuel Plaza*, Universidad Autónoma de Madrid, Spain		

Report:

We report an investigation on the structural properties of Pt/YIG (Yttrium Iron Garnet) using surface x-ray diffraction. We aimed at determining the growth mode of Pt on YIG(111) and the influence of parameters like the evaporation flux and deposition temperature. The experiments ran well and we obtained satisfactory results that will allow us to draw a complete picture of the interface structural properties. We prepared successfully a YIG(111) surface. The pristine YIG(111) surface was characterized using SXRD (bulk CTR's and surface reflectivity). The (111) YIG film is epitaxially grown on top of a GGG (Gadolinium Gallium Garnet) substrate. This situation is reflected in the surface reflectivity, which shows a characteristic two-period oscillation. The substrate CTRs allowed us to characterize the quality of the substrate termination. Next, we deposited Pt in a broad temperature range. The quality of the epitaxial film was probed by measuring equivalent reflections in the (111) orientation and by checking the absence of diffraction rings and/or additional reflections. The Pt film grown exhibits a (111) orientation, determined by the substrate. However, crystallites with different registries are grown at RT, preventing the formation of a uniform epitaxial film of high quality. We find that evaporation at higher temperatures favors the formation of larger (111) domains in registry, and that a film of good quality can be grown if Pt is evaporated at sufficient temperature. However, care must be taken, as a too high temperature affects the surface quality. Work is in progress to conclude the analysis of the data obtained, although due to the long preparation time required to optimize the growth conditions, it was not possible to obtain a full data set.