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Thermal Processing and Overlayer Effects of Ultra-Thin Fe Layers on GaAs(001)[1] JUSTIN SHAW, University of Arizona, CHARLES FALCO, University of Arizona — We used Brillouin Light Scattering (BLS) and Magneto-Optical Kerr Effect (MOKE) measurements to study the magnetic properties of ultra-thin Fe layers undergoing various growth and post-deposition thermal processes. We found that the critical Fe thickness required for the onset of ferromagnetism can be significantly reduced through annealing processes. Iron islands coalesce and become more ordered following these annealing processes, which also results in the formation of a stable ferromagnetic phase in the Fe layer. The thermal processing also has a profound impact on the magnetic anisotropy and surface structure. In situ Scanning Tunneling Microscopy (STM) revealed that high temperature post-deposition annealing results in the formation of rectangular pits while high temperature growth results in a rough faceted microstructure. In addition, we found that Al and Au overlayers suppress the uniaxial anisotropy at the interface.

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