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SQUID NMR Studies of Two-Dimensional ^{3}He Films on HOPG ZYX Graphite JINSHAN ZHANG, LEI GUO, YULIANG DU, C.M. GOULD, H.M. BOZLER, Dept. of Physics & Astronomy, Univ. of Southern California, Los Angeles, CA 90089 — SQUID NMR experiments on the second layer of ^{3}He films on Grafoil substrates in the low field limit found ferromagnetic ordering for coverages over 20 atoms/nm^2. The appearance of ordering in a two-dimensional magnetic film can be caused by weak anisotropy and/or dipolar interactions, or could be a manifestation of finite size effects. By replacing Grafoil with Highly Oriented Pyrolytic Graphite (HOPG) ZYX grade, we increased the substrate structural coherence length by a factor of 10 in order to study the importance of finite size effects through a magnetization measurement on 2-D ^{3}He films. Our recent experiments found the ferromagnetic ordering temperature to be the same or higher on ZYX than on Grafoil at coverages over 20 atoms/nm^2, showing no evidence for an increased suppression of the ordering due to the increasing coherence length. We also saw evidence for bound spin waves in the ordered layer. Studies in the coverage range 20-24 atoms/nm^2 are complicated by the possibility of coexistence of two phases. Recently we extended our measurements to higher coverages where the situation is less complicated and a single incommensurate solid phase is formed unambiguously. We report on these studies which continue to support the picture of a 2-D magnetically ordered solid. *Supported by NSF through grant DMR-0307382

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