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Surface Ferromagnetism in Pt films PUSHKAL THAPA, Dept. of Physics, Wayne State University, Detroit, MI 48201, USA, PARASHU KHAREL, Dept. of Physics , Univ. of Nebraska, Lincoln, Nebraska 68588, USA, RENAT SABIRIANOV, Nebraska Center for Materials and Nanoscience, Univ. of Nebraska, Lincoln, Nebraska 68588, USA, MOHAMMAD FAIZ, Dept. of Physics , Wayne State University, Detroit, MI 48201, USA, JULIE BORCHERS, NIST Center for Neutron Research. Gaithersburg, MD, 20899, USA, DAVID SELLMYER, Dept. of Physics and Astronomy, Univ. of Nebraska, Lincoln, Nebraska 68588, USA, BORIS NADGORNY, Dept. of Physics, Wayne State University, Detroit, MI 48201, USA — It has long been recognized that Pt as well as some other noble metals are on the verge of being magnetic, with ferromagnetism in these metals readily detected in nanoparticles. Here we report the observation of surface ferromagnetism in Pt thin films. Both sputtered and e-beam evaporated Pt films of various thicknesses (from $10 \sim 100$ nm) have been studied. Detailed SQUID measurements indicate that the film magnetization is largely independent of its thickness. This result is consistent with the neutron scattering data, indicating the presence of a magnetic moment near the top Pt surface, and with the spin polarization measurements by point contact Andreev reflection spectroscopy, demonstrating a sizable spin polarization. Our experimental observations are supported by the first principle density functional calculations showing that certain configurations of Pt atoms on Pt (111) surface exhibit a magnetic moment of up to 1.1 μ_B per Pt atom. We argue that magnetism in this system is due to band narrowing, related to reduced coordination numbers of Pt atoms located at the surface.

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