

Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Spin-orbit coupled superconductivity at the interface of LaAlO₃/SrTiO₃¹ WEI-LI LEE, CHI-SHENG LI, AKHILESH SINGH, MING-YUAN SONG, Institute of Physics, Academia Sinica, MING-WEN CHU, Center for Condensed Matter Science, National Taiwan University, Taipei, Taiwan — By using oxide MBE technique, we have grown few monolayers of epitaxial LaAlO₃ (LAO) on TiO₂ terminated SrTiO₃ (STO) substrates, which shows an interface superconductivity below about 0.3 K. Scanning tunneling electron microscope images revealed a sharp atomic interface between LAO and STO in our LAO/STO samples. By fabricating a back gate electrode via the STO substrate, the superconductor-insulator transition was observed by applying gate voltages on a macroscopic size of the twodimensional electron liquid (2DEL) at the interface of LAO/STO. From the superconducting critical field anisotropy measurements, a sizable spinorbit coupling (SOC) is likely to present in the superconducting phase, where the upper limit of the SOC strength can be largely tuned by gate voltages. In addition, magnetotransport anomaly was found when depleting the electron density and thus driving the 2DEL into insulating phase, suggesting an inhomogeneous density distribution and also a possible multiband conduction in the 2DEL.

¹We acknowledge the funding supports from the Academia Sinica and MOST in Taiwan.

Wei-Li Lee
Institute of Physics, Academia Sinica

Date submitted: 02 Nov 2016

Electronic form version 1.4