Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Electrostatic Modification of Properties of Ultrathin YBCO Films using an Electronic Double Layer Transistor XIANG LENG, ALLEN GOLDMAN, University of Minnesota — We have modified the transport properties of ultrathin films of YBCO using an electronic double layer transistor configuration employing the ionic liquid DEME-TFSI [1]. The films were prepared on STO substrates using high pressure oxygen sputtering. The electronic double layer configuration permits extraordinarily large transfers either involving the accumulation or depletion of carriers, employing relatively low gate voltages. Thus far the transition temperature of a 10 unit cell thick film has been shifted by as much as 30K, and the insulating state has been induced in a 7 unit cell thick film. The latest results will be reported on the use of this technique as an alternative to chemical doping. This work was supported by the National Science Foundation under grant NSF/DMR-0709584.

[1] J.T. Ye et al., Nature Materials 9, 125(2010).

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Date submitted: 30 Dec 2010 Electronic form version 1.4