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Liquid-gated superconductor-insulator transition in an electron-doped cuprate SHENGWEI ZENG, NUSNNI-Nanocore and Physics Department, NUS, Singapore, ZHEN HUANG, NINA BAO, WEIMING LV, NUSNNI-Nanocore, NUS, Singapore, ZHIQI LIU, NUSNNI-Nanocore and Physics Department, NUS, Singapore, T.S. HERNG, Department of Materials Science and Engineering, NUS, Singapore, K. GOPINADHAN, LINKE JIAN, NUSNNI-Nanocore, NUS, Singapore, J. DING, Department of Materials Science and Engineering, NUS, Singapore, T. VENKATESAN, ARIANDO ARIANDO, NUSNNI-Nanocore and Physics Department, NUS, Singapore — Doping charge carriers will causes the change of cuprates from antiferromagnetic Mott insulators to high-T_c superconductors. Continuous changing of carrier density is necessary to understand the nature of such phase transition, and thus, further our understanding of cuprate superconductors. Electric field-effect doping, especially with electronic double layer transistors (EDLT) configuration which use ionic liquids (ILs) and polymer electrolyte as the gate dielectrics, is a potential avenue for this investigation and it has been shown its effectiveness in inducing phase transition in strongly correlated electron system. Owing to EDLT, superconductor-to-insulator transition (SIT) has been observed in hole-doped cuprates $La_{2-x}Sr_xCuO_4$ and $YBa_2Cu_3O_y$. Here we use EDLT to tune the carrier density in electron-doped cuprates $Pr_{2-x}Ce_xCuO_4$ ultrathin films and cause the sample evolves from a superconducting state to an insulating state. This present results could be helpful to study SIT between electron- and hole-doped cuprates.

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