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Link Between Mobile Band Population and Superconductivity in SrTiO₃/LaAlO₃ Interface¹ ERAN MANIV, MOSHE BEN SHALOM, ALON RON, IZHAR NEDER, MOSHE GOLDSTEIN, ALEXANDER PALEVSKI, YORAM DAGAN, Tel Aviv University — The entire superconducting phase diagram of SrTiO₃/LaAlO₃ is scanned using back gate voltage. The superconducting transition temperature T_c and critical field H_c are recorded along with the Hall resistance and Shubnikov-de Haas (SdH) effect. The latter is sensitive only to the density of the mobile band while the former probes all bands. We find that T_c and H_c follow a similar non-monotonic gate voltage dependence as the SdH frequency and the low field Hall. This suggests that the mobile band is getting depopulated at high gate voltages resulting in the reduction of T_c on the overdoped side. We discuss a possible scenario for this peculiar behavior.

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