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**Electrostatically defined superconducting quantum interference devices at the $LaAlO_3/SrTiO_3$ interface** SRIJIT GOSWAMI, EMRE MULAZIMOGLU, ANA MONTEIRO, Kavli Institute of Nanoscience, Delft University of Technology,The Netherlands, ROMAN WOELBING, DIETER KOELLE, REINHOLD KLEINER, Physikalisches Institut - Experimentalphysik II, Eberhard Karls Universitaet Tuebingen, Germany, YAROSLAV BLANTER, LIEVEN VANDERSYPEN, ANDREA CAVIGLIA, Kavli Institute of Nanoscience, Delft University of Technology,The Netherlands — Two-dimensional superconductivity at the $LaAlO_3$ (LAO)/ $SrTiO_3$ (STO) interface can be controlled via the field effect, whereby a global back gate can be used to systematically tune the critical temperature ($T_c$) of the bulk superconductor. Here, we exploit this sensitivity of $T_c$ to the field effect to create an electrostatically defined superconducting quantum interference device (SQUID) at the LAO/STO interface. The device consists of a superconducting loop with nanoscale local top gates on each arm. By controllably depleting carriers below the gates we create a SQUID with two identical Josephson junctions (JJs), giving rise to flux-periodic oscillations in the critical current. Furthermore, by independently tuning the two JJs we create an asymmetric SQUID, which allows us to accurately estimate an extremely large kinetic inductance of about 60nH. While other examples of gate-tunable JJs do exist, they necessarily involve physical interfaces between two dissimilar materials. In contrast, our gate-defined SQUIDs are unique in that the entire device is made from a single superconductor with purely electrostatic interfaces.

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