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Stripes of enhanced transition temperature in superconducting strontium titanate HILARY NOAD, KATJA NOWACK, ERIC SPANTON, Stanford Institute for Materials and Energy Sciences, HISASHI INOUE, Department of Applied Physics, Stanford University, MINU KIM, CHRIS BELL, YASUYUKI HIKITA, Stanford Institute for Materials and Energy Sciences, HAROLD HWANG, Stanford Institute for Materials and Energy Sciences; Department of Applied Physics, Stanford University, KATHRYN MOLER, Stanford Institute for Materials and Energy Sciences; Departments of Physics and Applied Physics, Stanford University — Strontium titanate ($SrTiO_3$) is used widely in heterostructures that are the subject of intense research, such as the $LaAlO_3/SrTiO_3$ interface and FeSe grown on $SrTiO_3$, yet the nature and mechanism of superconductivity in $SrTiO_3$ itself are not fully understood. We used a scanning superconducting quantum interference device susceptometer to map the superfluid density as a function of temperature in a 5.5 nm-thick slab of niobium-doped $SrTiO_3$ embedded in undoped $SrTiO_3$. We find that stripe-like regions of the sample remain superconducting to temperatures typically $\sim$40 mK higher than the transition temperature of featureless regions. We associate the stripes with tetragonal domains in $SrTiO_3$, showing that the orientation of the tetragonal c-axis may be important for tuning the critical temperature. These data may be useful for distinguishing models of superconductivity in $SrTiO_3$.

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