

Abstract Submitted
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Current Bias Induced Negative Magneto-Resistance in Superconducting Tantalum Thin Films¹ SUN-GYU PARK, EUNSEONG KIM, Center for Supersolid & Quantum Matter Research and Department of Physics, KAIST, Daejeon, 305-701, Republic of Korea — Negative Magneto-Resistance (MR) of 2D superconducting thin films has received attentions because the decreasing resistance with increasing magnetic field cannot be simply understood by conventional superconductivity. This behavior was ascribed to localized bosons, indicating the existence of a Bose insulator (BI) phase[1-3]. We found negative MR within a range of dc current bias in tantalum thin films, whereas no negative MR appears without bias. We measured R_{xx} and R_{xy} simultaneously as functions of current bias and magnetic field and construct the phase diagram at $T=0$ limit. We found that the DC biased negative MR in Ta thin film shows substantially different characteristics from those of reported no biased negative MR. We also found that the induced BI can be understood by the vortex instability state [4, 5].

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Sun-gyu Park
KAIST

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