

Abstract Submitted
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The effects of negative dynamic resistance of DC SQUIDS¹ SING-LIN WU, Department of Physics, National Tsing Hua University, Hsinchu, Taiwan, MING-JYE WANG, Institute of Astronomy and Astrophysics, Academia Sinica, Taiwan, CHENG-CHUNG CHI², Department of Physics, National Tsing Hua University, Hsinchu, Taiwan — We have fabricated low T_C DC SQUIDS using Nb-AlOx-Nb trilayer technology. These SQUIDS are of first-order gradiometer type with direct signal coupling loop of diameter from $10\mu\text{m}$ to $20\mu\text{m}$. The Stewart-McCumber parameter is about 0.25 and the current density is about 1000 A/cm^2 . In addition to the expected non-hysteretic and smooth current-voltage (I-V) curves, we have often observed negative dynamic resistance in certain range of I-V curves of some samples. The voltages at which these negative resistances occur shift periodically with the applied magnetic flux. The effect of negative resistance on the noise spectrum will be discussed. We have also studied the I-V curves of dc SQUIDS in the presence of rf fields in the frequency range 2-18GHz. Strong voltage locking at half-integral as well as the usual integral Shapiro step spacing is observed when the applied dc-magnetic flux is close to half-integral numbers of flux quanta. The possible relationship of the half-integer Shapiro steps and the negative resistance will be explored.

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