Fabrication of SQUIDs using $Bi_2Sr_2CaCu_2O_{8+x}$ Intrinsic Josephson Junctions

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We studied operating characteristics of dc SQUIDs fabricated in stacks of intrinsic Josephson junctions formed in high-T_c superconducting $Bi_2Sr_2CaCu_2O_{8+x}$ single crystals by using the double-side cleaving technique. In comparison with the previous effort by Kim *et al.* [1]., the plane of the SQUID loop was formed in the planar direction of the stacks. This technique combined with microfabrication and ion-beam etching provides better-defined SQUID geometry than the fabrication using the focused-ion-beam etching employed previously with the SQUID loop formed perpendicular to the planar direction [1]. It also provides more flexibility in increasing the loop area, hence enhancing the magnetic-flux measurement sensitivity. As long as the detecting field intensity is lower than the lower critical field of the superconducting material the magnetic field modulation of the loop resistance by an external field is not interfered by the single-junction Fraunhofer interference. We observed a strong evidence for the magnetic-field modulation of the loop resistance, which suggests the high possibility of making DC SQUIDs based on $Bi_2Sr_2CaCu_2O_{8+x}$ intrinsic Josephson.

[1] S. J. Kim *et al.*, J. Appl. Phys., **91**, 8495 (2002).

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