Enhancement of the magnetic flux in a superconducting system of the multiple thin strips

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The main purpose of this article is to investigate the flux-focusing effect [1] in a superconducting system of multiple long parallel coplanar superconducting thin strips carrying the overall subcritical currents in perpendicular applied magnetic field when there is no net magnetic flux through the slots except the central slot; i.e. we calculate the effective area of the central slot, which is the area that would intercept the total magnetic flux in a uniform magnetic field flux density $\boldsymbol{B}_a = \mu_0 H_a$,when the system of strips is in a perpendicular applied magnetic field H_a[1,2]. To do so, first we present the numerical solution for the Meissner-state magnetic-field and current-density distributions for the system and then we show that for narrow superconducting strips the effective area is substantially increased as the number of the strips is increased, which is an indication of concentrating the magnetic flux in the central slot.

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