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Inverse Spin Hall Effect in Josephson Contacts SEVERIN
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versity of Science and Technology — We demonstrate that Rashba spin orbit cou-
pling together with Zeeman fields create an effective electromagnetic vector-potential
in the normal part of an SNS Josephson junction in thermal equilibrium. Conse-
quently, a phase difference between order parameters of the two superconducting
terminals is induced, in analogy to the Meissner effect. The resulting phase-coherent
equilibrium supercurrent is a counterpart of the non-equilibrium inverse spin Hall
effect in normal metals. The calculations have been carried out in the diffusive
regime on the basis of Usadel equations and assuming low transparency tunneling
contacts. Apart from this effect, we also consider an in-plane homogeneous Zeeman
field in the transverse direction.

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