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Effect of pair-breaking on superconductivity and on persistent currents well above the transition temperature

ORA ENTIN-WOHLMAN, Ben Gurion University

We consider the mesoscopic normal persistent current (PC) in a very low-temperature superconductor with a bare transition temperature much smaller than the Thouless energy. We show that in a rather broad range of pair-breaking strength, in-between the bare transition temperature and the Thouless energy, the transition temperature is renormalized to zero, but the PC is hardly affected. This may provide an explanation for the magnitude of the average PC's in the noble metals, as well as a way to determine their bare transition temperatures.