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The onset of superconductivity at normal/superconducting interface

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Abstract

We Study a modified model of Ginzburg and Landau that considers superconducting electrons diffusing into a normal material in contact with a superconductor. We assume that each region occupy a half-space with a constant applied field parallel to the interface. we show, if the normal conductivity of the superconductor is less than the conductivity of the normal material then normal states are local minimizers for fields down to H_{c2}, which agrees with experimental observations that superconductivity is suppressed in this case. While when the conductivity of the superconductor is larger than that for the normal material the onset occur at fields larger than H_{c2} but less than H_{c3}.