

# Quasiclassical Theory of Superconducting Multi-Layers

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We study the density of states of a thin normal metal layer in proximity to a bulk  $s$ -wave superconductor in the clean as well as in the dirty limit. We find that for increasing impurity scattering a mini-gap is established in the normal metal. Furthermore we consider a spin-active surface of the normal metal (e.g. due to an additional ferromagnetic layer) and observe a suppression of the mini-gap.