

On two alternative methods in the theory of superconductive contacts

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Two methods of the calculations of the current states in SNS junctions are discussed. The first one uses the Bogolyubov equations which are considered out the spectrum in the complex plane. In the other method the same equations are considered on the spectrum. In both methods we use the quasiclassical equations for description superconductive state. The SN interface may have no electron reflection or in alternative case transmission coefficient D may be less than 1. In the first case we can speak about SNS junction, in the other one – about SINS junction. The SINIS junction was considered too. We show that in the first method the Green functions may be constructed from two solutions: the first is regular on the $+\infty$ and the other is regular on the $-\infty$. Both solutions can be find in quadratures. The second method needs full information about the spectrum. However for the negative part of the spectrum we obtain transcendental equation that can't be solved analytical. Some authors used numerical calculations but we could show that contribution is canceled with the part of contribution of the continual spectrum and we have the result obtained in the first method.