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Pair correlations in semiconductor-superconductor junctions¹ JAMES ECKSTEIN, University of Illinois at Urbana-Champaign, MICHAEL VIS-SERS, STEPHANIE LAW, ALLISON DOVE, PAUL GOLDBART — We have studied the proximity effect in several different superconductor-semiconductor junction systems using a new three-terminal device which independently measures how both the junction conductance and semiconductor resistance change as a function of temperature. Both of these quantities are modified by proximity-induced pair correlations. We find that two factors are particularly important, namely the transmission coefficient of the junction between the semiconductor and the superconductor, and the thickness of the doped semiconductor layer. When the transmission coefficient is high, ¿ 0.7, pair correlations are present below Tc, regardless of the thickness of the semiconductor film. If the transmission coefficient is ¡ 0.04, pair correlations are evident only for very thin semiconductors; a thicker normal layer suppresses pair correlations, even at the interface.

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