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Peculiarities of the BCS theory of superconductivity

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We study the effect of the relative value of the chemical potential with respect to the middle of the attraction band, on the results of the BCS theory of superconductivity. In this way, we observe that the phenomenology predicted by the theory is much richer than previously expected. If the attraction band (i.e. the interval in which the pairing interaction is manifested) is not symmetric with respect to the chemical potential, then the equation for the energy gap has two solutions, the superconductor-normal metal phase transition temperature is changed, and the phase transition may become of the first order. The phase transition temperature decreases with the asymmetry, so, if the asymmetry is modified by doping of the superconductor or by applying pressure, then a structure similar to the so called superconducting dome is formed if we plot the transition temperature vs. doping or pressure.

Biography

Dragos Victor Anghel has completed his PhD in year 2000, at the University of Jyvaskyla, Finland. From 2000 to 2005 he held Postdoc positions in the University of Jyvaskyla and in the University of Oslo. From 2005 he moved to IFIN-HH, Romania (the present institution), where he is now Senior Researcher (grade 1) and a member in the Editorial Board of the journal Romanian Reports in Physics. He is an author or coauthor of more than 60 papers in reputed physics ISI journals and participated as an invited speaker in numerous prestigious international conferences.

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