Abstract

The s-wave and p-wave Cooper pairing in Uranium and Cerium based HF systems has been studied by analyzing the periodic Anderson model by means of the Bogoliubov-Valatin approach (BVT) while focusing on the interorbital Cooper pairing between a conduction electron (c electron) and an f electron, called the "c-f pairing." It is shown that the s-wave and p-wave superconductivity appears to coexist with long-range antiferromagnetic order. Moreover, the study with different reference systems used in the BVT shows that the interorbital c-f pairing is essential for the appearance of the s-wave and p-wave superconductivity. The ground state energy (Eo) specific heat (Cv) and electronic specific heat coefficient (γ) of HF superconductors have been determined in the framework of the integrated s-wave and p-wave pairing model. The critical temperature for Uranium and Cerium based compounds is TC=1.8K and TC=1.2K respectively which are in agreement with known experimental values. The results show that uranium based compounds can be modelled for high temperature superconductivity.

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