

## Coexistence of Magnetism and Superconductivity in $\text{HoNi}_2\text{B}_2\text{C}$

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**Abstract.** We have presented a microscopic theory of the effect of external magnetic field on the co-existence of superconductivity and anti-ferromagnetism in the rare earth nickel borocarbide compound,  $\text{HoNi}_2\text{B}_2\text{C}$ . The model proposed earlier for heavy fermion superconductors has been adopted here to take into account the effect of external magnetic field in the presence of hybridization for this rare earth compound. We have derived self-consistent equations for the superconducting and antiferromagnetic order parameter using equation of motion of Green's function in presence of external magnetic field. Also the temperature dependence of gap parameters has been studied. The calculated ratio of the effective gap and  $T_C$  has been found to be close to BCS value and also agrees quite well with the experimental results.

**Keywords:** Superconductivity; anti ferromagnetism; borocarbides

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