

Estado Sólido Avanzado

Tarea 06: Superconductividad

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Problema 1 *Specific heat variations*

Find the temperature T where,

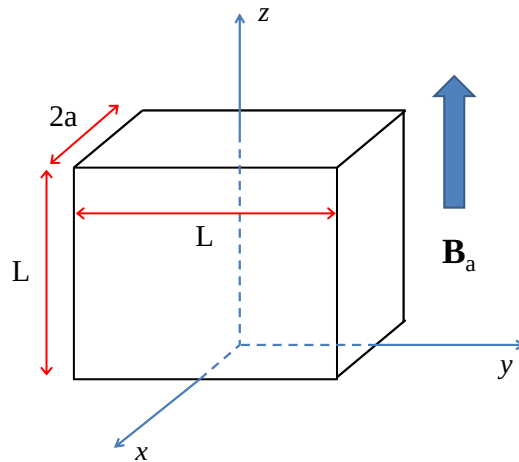
$$C_s(T) = C_n(T),$$

where $C_i(T)$ is the specific heat in the $i = s, n$ state (s =superconducting, n =normal).

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Problema 2 *London equations: superconducting flat slab*

For a flat SC slab of finite thickness $2a$ in an applied parallel magnetic field $\mathbf{B}_a = B_a \hat{\mathbf{k}}$,



(a) Demonstrate that the field inside the superconducting slab is given by,

$$B(x) = \frac{\cosh(x/\lambda_L)}{\cosh(a/\lambda_L)} B_a.$$

(b) Find that,

$$\mu_0 M(x) = - \left(\frac{1}{8\lambda_L^2} \right) [(2a)^2 - 4x^2] B_a \quad \forall \quad a \ll \lambda_L$$

where $M(x)$ is the magnetization of the system.

(c) Finally, calculate the value of the critical field B_c when $a \ll \lambda_L$ and $a \gg \lambda_L$.

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