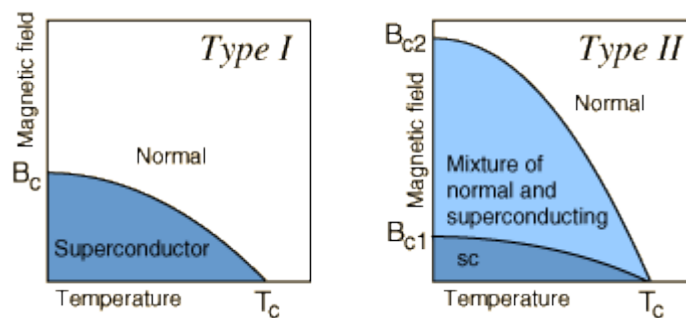


## Answer on Question #51574, Physics, Solid State Physics

Explain with the help of diagrams the magnetism in a superconductor when it is cooled in the presence of a magnetic field.

### Answer:

The superconducting state cannot exist in the presence of a magnetic field greater than a critical value, even at absolute zero. This critical magnetic field is strongly correlated with the critical temperature for the superconductor, which is in turn correlated with the bandgap. Type II superconductors show two critical magnetic field values, one at the onset of a mixed superconducting and normal state and one where superconductivity ceases.



*Fig.1*

It is the nature of superconductors to exclude magnetic fields (Meissner effect) so long as the applied field does not exceed their critical magnetic field. This critical magnetic field is tabulated for 0K and decreases from that magnitude with increasing temperature, reaching zero at the critical temperature for superconductivity. The critical magnetic field at any temperature below the critical temperature is given by the relationship