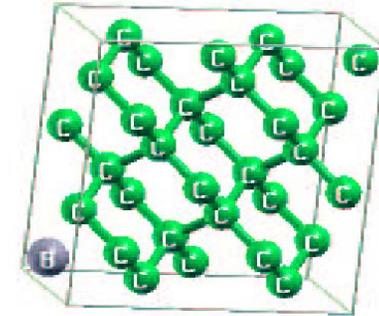


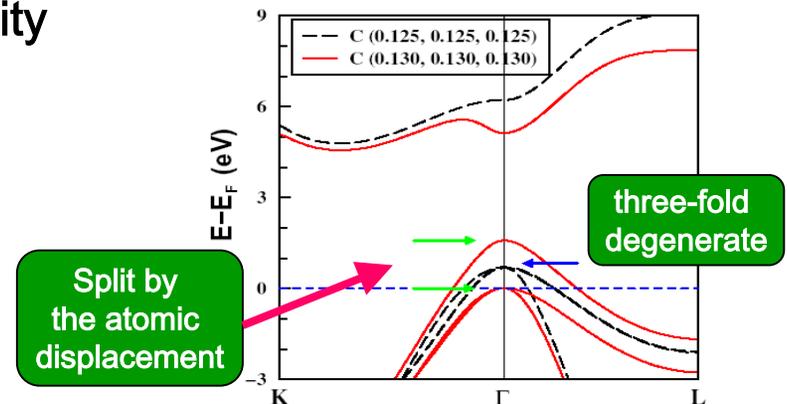
Theory of Superconducting Diamond due to Hole doping with Boron

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Diamond, the world's hardest material and one of its most beautiful, has been found by a Russian-American collaboration also to become superconducting ($T_c = 4\text{K}$) when doped heavily with boron. Microscopic calculations have now revealed that the cause of superconductivity is the same as the origin of hardness. It is charge carriers in the very strong carbon-carbon bond that pair and condense into the superconducting state.



Schematic drawing of a boron impurity in the diamond lattice. The superconducting concentration (3%) is very close to what is pictured.



Band structure around the semiconducting gap of B-doped diamond without (black dashed lines) and with (red solid lines) stretched C-C bonds.

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