Impurity Effects on Superconducting Properties coming from Nontrivial Nodal Structures in Order Parameters[1] HEESANG KIM, HYUN-HEE CHUNG, NAMMEE KIM, Department of Physics, Soongsil University, Seoul 156-743 Korea — Power-law behavior is expected in the temperature dependence of the specific heat in a superconductor whose order parameter has point- or line-nodes on its fermi surface. It is known that the dependence is T^2 for line-nodes and T^3 for point-nodes. However, the power-law behavior is different from what we expect in some cases such as g-wave and $g+s$-wave. We present the generalized power-law behavior in a superconductor with a nontrivial nodal structure in its order parameter. We also show how the presence of impurities wash out the power-law behavior. In the framework of the quasiclassical formalism, we focus on the density of states and the specific heat. We also present evolution of those quantities in the presence of impurities. The impurity effect is parameterized with two quantities, the scattering cross section σ and impurity scattering rate $1/2\tau$, so that we can cover the whole range of the impurity effect from the Born limit to the unitary limit.

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