

Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Impurity Effects on Superconducting Properties coming from Nontrivial Nodal Structures in Order Parameters¹ 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.

¹This research was supported by Basic Science Research Program through the National Research Foundation of Korea(NRF) funded by the Ministry of Education, Science and Technology(grant 2012R1A1A2006303)

Heesang Kim
Department of Physics, Soongsil University, Seoul 156-743 Korea

Date submitted: 08 Nov 2012

Electronic form version 1.4