

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Simulation of electronic structures of nano-scaled superconductors using 3-dimensional finite element method MASARU KATO, Osaka Prefecture University, JST-CREST — I have developed numerical method for investigating the electronic structures in the nano-scaled superconductors, effectively, using three-dimensional finite element method. Previously co-workers and I investigated the electronic structures in the nano-scaled superconducting plate using two-dimensional finite element method. In those studies, we obtained stable magnetic flux structures and the quasi-particle structures around these magnetic fluxes. Especially, we investigated stability of the giant vortex, which has a doubly quantized magnetic flux. Also we found the transition temperature enhancement for the nano-scaled superconducting plate due to the inhomogeneous superconducting structure. But because of the two-dimensionality of previous method, we cannot investigate the three dimensional structures of the quantized magnetic fluxes, for example, Josephson vortices and pancake vortices in the cuprate high-Tc superconductors. In this study, I investigate such three dimensional vortex structures using this microscopic three-dimensional numerical method.

Masaru Kato
Osaka Prefecture University, JST-CREST

Date submitted: 20 Nov 2009

Electronic form version 1.4