1108-35-66 **Alex Misiats*** (omisiats@purdue.edu), 150 N University str., West Lafayette, IN 47907.

Ginzburg Landau superconductivity model with prescribed topological degrees on the boundary.

Superconductivity is a complete loss of resistivity that occurs in most metals below a certain critical temperature. The key feature of this physical phenomenon is the vortices, or the points where the external magnetic field penetrates the bulk of a superconductor, thus destroying superconductivity. We model the superconducting vortices using the Ginzburg-Landau functional with a specific (degree) boundary condition that creates the same "quantized" vortices as the external magnetic field. In my talk, I will discuss the issue of well-posedness of such modelling, which reduces to the question of the existence of minimizers for a Ginzburg-Landau functional in certain functional classes. I will also describe the vortex structure of the Ginzburg-Landau minimizers, which may be useful in predicting the locations of the vortices depending on the geometry of a superconductor. (Received December 21, 2014)