1105-49-148 **Oleksandr Misiats***, 150 N University str, West Lafayette, IN 47907. *Ginzburg-Landau Model of Superconductivity with Prescribed Topological Degrees on the Boundary.*

Superconductivity is a complete loss of resistivity that occurs in most metals below a certain, extremely low 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 (semi-stiff, or 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 with semi-stiff boundary conditions. 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 September 16, 2014)