1126-58-109 **Nicholas M. Ercolani*** (ercolani@math.arizona.edu). *Ginzburg-Landau Equations on Riemann Surfaces of Higher Genus.*

It is well known that there is a critical value in the coupling parameter of the Ginzburg-Landau (GL) equations that separates superconductors into two classes with different properties: Type I superconductors, which exhibit first-order phase transitions from the non-superconducting state to the superconducting state, and Type II superconductors, which exhibit second-order phase transitions and the formation of vortex lattices. Mathematically the existence and description of these latter vortex lattice states (known as Abrikosov lattices) can be reformulated in terms of studying the GL equations on a line bundle over a genus 1 Riemann Surface.

In this talk we will describe and study the extension of this model to the setting of line bundles over a higher genus Riemann surface. This brings into play methods related to the integrable systems approach to abelian Yang-Mills-Higgs theory, but also critical extensions thereof. Time permitting, we will briefly indicate extensions of this study to the vector bundle setting which has relevance for Hilbert's 21st problem. This is joint work with Dmitry Chouchkov, Steve Rayan and Michael Sigal. (Received January 07, 2017)