PHYSICS AND ASTRONOMY COLLOQUIUM

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"Radio-frequency superconductivity for particle accelerators at TRIUMF and beyond"

Abstract

Superconductors have attracted significant research in the past decades with the development of high temperature superconductors allowing for lossless current flow at temperatures above 77K. However, at alternating fields superconductors exhibit intrinsic losses which increase by orders of magnitude when magnetic flux penetrates the material. When the applied field exceeds the lower critical field Hc1 it becomes energetically favorable for flux to be located inside the superconductor instead of being expelled by the Meissner effect leading to penetration in the absence of an energy barrier at the surface. Hc1 is generally about one order of magnitude below the maximum fields achieved in DC applications. Therefore, research in superconducting radiofrequency (SRF) hasnôt progressed much beyond simple alloys and films. The main application of superconductors exposed to radiofrequency fields is in particle accelerators. Resonant cavities confine electromagnetic fields and transform this energy to charged particles passing through them. In this talk I will give a general introduction to the field focusing on TRIUMF´s infrastructure and outline research to push performance beyond current state of the art.

Thursday, September 6, 2018

9:30 a.m.

Elliott Building - Room 226