

HIGH ENERGY PHYSICS

U. CHICAGO, ENRICO FERMI INSTITUTE

The Monday HEP Seminar

Physics and Materials Science
at the Heart of Accelerator Technology:
Limits and Promise of Superconducting RF Cavities



Alexander Romanenko, Fermilab

Abstract: Several decades ago, resonant superconducting radio frequency (SRF) cavities were proposed to replace normal conducting ones in particle accelerators. Since then successful development efforts lead to the primary role of SRF technology in most of the current and proposed future accelerators. At the heart of the progress was understanding and overcoming performance-limiting phenomena, which were occurring on the macroscale (i.e. multipacting, field emission, thermal breakdown). Currently, enabling the next generation of the SRF technology requires micro- and nanoscale understanding of the materials science and superconductivity in niobium and other materials. Such wide effort involving various state-of-the-art techniques (i.e. positron annihilation spectroscopy, muon spin rotation, cryo-TEM, etc) and cavity experiments has been ongoing at Fermilab in recent years leading to a number of surprising developments and technological breakthroughs. In this talk I will present these findings and discuss their promising implications for future accelerators and fundamental physics experiments based on SRF cavities.

Monday, March 31, 2014

4:15PM in LASR 162

If any assistance is needed, please call Aspasia Sotir-Plutis in advance at (773) 702-8113