Contribution ID: **540** Type: **Contributed Oral Presentation**

Characterizing thin films by RF and DC methods

Monday 10 July 2017 11:30 (15 minutes)

Several particle accelerators like the LHC at CERN use superconducting cavities to increase the energy of charged particles produced by sputter coating a thin niobium film on a copper substrate. Coating technologies used are diode and DC magnetron sputtering (dcMS). Compared to the bulk niobium technology the performance of such thin film cavities is limited by the field dependent RF residual surface resistance. The current application space is therefore usually at relative low frequency (up to 400 MHz), high temperature (4.2 K) and moderate accelerating gradient (a few MV/m). Several new techniques are currently being developed to overcome this limitation. The HiPIMS technology is very similar to dcMS. Films have been deposited and tested on 1.3 GHz test cavities. Other coating techniques like electron cyclotron resonance (ECR) are not yet developed to be deposited on cavities. Here sample tests can give invaluable information on the RF performance. A suitable device which can measure the surface resistance with unpreceded accuracy is the Quadrupole Resonator from CERN, which has more recently been rebuilt and further developed at HZB. Additionally DC methods can be used to probe the superconducting properties of samples and guide the development of the coating process. Two techniques which have been proven to be very informative for SRF developments are muon spin rotation and point contact tunneling. This article reviews RF and DC methods and results on test cavities and samples for SRF application.

Authors: JUNGINGER, Tobias; VALENTE-FELICIANO, Anne-Marie (Jefferson Lab)

Presenter: VALENTE-FELICIANO, Anne-Marie (Jefferson Lab)

Session Classification: M1OrD - Focused Session: Superconducting Thin Films for SRF and Magnets Applications