

## On the qualification of niobium materials for Superconducting Radio Frequency Cavity applications

*Friday, September 2, 2016 12:00 PM (30 minutes)*

High energy particle accelerators with continuous wave or long-pulse accelerating fields (or gradients) above a few million volts per meter ( $MV\ m^{-1}$ ) will be of much interest in the context of the future ADS programs. In such applications niobium-based superconducting radio frequency (SCRF) cavities bring various advantages over the conventional copper RF cavities. Here we address the issues related to the qualifications of the niobium materials to be used for cavity fabrications, focusing particularly on the materials properties of niobium required for the functioning a SCRF cavity, and optimizations of the same properties for the best SCRF cavity performance in a reproducible manner. In this way the niobium materials are not necessarily characterized by their purity alone, but in terms of those materials properties, which will define the limit of the SCRF cavity performance and also other related material properties like thermal diffusivity in niobium at the cavity operating temperatures necessary for sustaining this best SCRF cavity performance. Furthermore we point out the need of standardization of the post fabrication processing of the niobium-SCRF cavities, which does not impair the optimized superconducting and thermal properties of the starting niobium-materials required for the reproducible performance of the SCRF cavities according to the design values

**Primary author:** Prof. ROY, Sindhunil Barman (IMagnetic & Superconducting Materials Section, Materials & Advanced Accelerator Sciences Division, Raja Ramanna Centre for Advanced Technology, Indore 452013, India)

**Co-author:** Dr MYNENI, Ganapati (Accelerator R&D, Jefferson Lab, 12050 Jefferson Ave, MS 602, Newport News, VA 23606 USA)

**Presenter:** Dr MYNENI, Ganapati (Accelerator R&D, Jefferson Lab, 12050 Jefferson Ave, MS 602, Newport News, VA 23606 USA)