Abstract Submitted
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Niobium Nitride Thin Films and Multilayers for Superconducting Radio Frequency Cavities[1] WILLIAM ROACH, The College of William and Mary, Department of Applied Science, DOUGLAS BERINGER, ZHAOZHU LI, The College of William and Mary, Department of Physics, CESAR CLAVERO, Lawrence Berkeley National Laboratory, ROSA LUKASZEW, The College of William and Mary, Department of Physics — Niobium nitride in thin film form has been considered for a number of applications including multi-layered coatings onto superconducting radio frequency cavities which have been proposed to overcome the fundamental accelerating gradient limit of ∼50 MV/m in niobium based accelerators [1]. In order to fulfill the latter application, the selected superconductor's thermodynamic critical field, H_C, must be larger than that of niobium and separated from the Nb surface by an insulating layer in order to shield the Nb cavity from field penetration and thus allow higher field gradients. Thus, for the successful implementation of such multilayered stack it is important to consider not just the materials inherent properties but also how these properties may be affected in thin film geometry and also by the specific deposition techniques used. Here, we show the results of our correlated study of structure and superconducting properties in niobium nitride thin films and discuss the shielding exhibited in NbN/MgO/Nb multilayer samples beyond the lower critical field of Nb for the first time.

[1] A. Gurevich, Appl. Phys. Lett., **88**, 012511 (2006).

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