Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Superconductivity and Magnetotransport of MBE grown Nb_2N/SiC and Nb_2N/AlN Heterostructures SURESH VISHWANATH, RUSEN YAN, ECE, Cornell University, Ithaca, NY-14853, SCOTT KATZER, NEERAJ NEPAL, BRIAN DOWNEY, DAVID MEYER, Electronics Science and Technology Division, U.S. NRL, Washington, DC 20375, GURU BAHADUR SINGH KHALSA, JOHN WRIGHT, MSE, Cornell University, Ithaca, NY 14853, YIMO HAN, DAVID MULLER, AEP, Cornell University, Ithaca, NY 14853, AMIT VERMA, IIT Kanpur, UP 208016, India, EDWARD LOCHOCKI, KYLE SHEN, Dept of Physics, Cornell University, Ithaca, NY 14853, HUILI GRACE XING, DEBDEEP JENA, ECE and MSE, Cornell University, Ithaca, NY 14853 — We find that plasma assisted molecular beam epitaxy (MBE) grown β-Nb_2N thin films [1] are metallic at room temperature, and undergo an electronic phase transition to the superconducting phase below about 10K. Hall-effect measurements reveal a bulk charge density of ˜4E23 cm^{-3} and a mobility of 0.4-0.9 cm^2/V.s. Superconducting transition temperature Tc ˜10K, in-plane and out of plane critical magnetic field as a function of temperature have been obtained using resistivity and vibrating sample magnetometry measurements. Using this data, an Ioffe-Regel parameter of 10-15, a coherence length of 5-12 nm, and the London penetration depth have been estimated for various thickness of high quality epitaxial Nb_2N films. We will contrast transport and structural quality in MBE Nb_2N with well-studied NbN by a detailed analysis of aforesaid measurements along with X-Ray diffraction and Transmission-Electron Microscopy data. [1] D.S.Katzer et al., Appl. Phys. Express 8 085501 (2015)

Suresh Vishwanath
ECE, Cornell University, Ithaca, NY-14853

Date submitted: 11 Nov 2016 Electronic form version 1.4