## Abstract Submitted for the MAR15 Meeting of The American Physical Society

Hall coefficient of ultrathin niobium in Si/Nb/Si trilayers<sup>1</sup> MARTA Z. CIEPLAK, I. ZAYTSEVA, O. ABAL'OSHEV, P. DLUZEWSKI, W. PASZKOWICZ, Institute of Physics, PAS, Warsaw, Poland, L.Y. ZHU, C.L. CHIEN, Johns Hopkins University, M. KONCZYKOWSKI, Ecole Polytechnique, Palaiseau, France — We study the structural and magnetotransport properties of ultrathin Nb layers in Si/Nb/Si trilayers, grown by magnetron sputtering at room temperature. The thickness of Nb, d, is in the range from 1.1 nm to 50 nm, with a fixed Si thickness of 10 nm. With decreasing d the superconductivity is suppressed for d < 1.2nm, and the structure of the Nb layers evolves, from polycrystalline at d > 6 nm, to amorphous at d < 3.3 nm. The Hall coefficient, positive in thick Nb layers, initially increases with decreasing d, but starts to diminish at d < 6 nm, and eventually changes sign into negative at d < 2 nm. In the thinnest Nb layers the dependence of the Hall voltage on magnetic field becomes nonlinear at low temperatures, indicating that two types of carriers contribute to transport. The influence of boundary scattering on the relaxation rate of carriers, and band broadening in the amorphous films, may be responsible for this effect. We discuss the correlation between the superconductivity suppression and the appearance of the electron contribution to the conductance, observed in the present films; we also compare our results to the properties of other previously studied ultrathin Nb films.

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