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Length Scale Effects On The Electronic Transport Properties Of Cu/Nb Bilayers A.L. LIMA, Los Alamos National Laboratory, X. ZHANG, A. MISRA, C.H. BOOTH, Lawrence Berkeley National Laboratory, E.D. BAUER, M.F. HUNDLEY — In this paper, bilayers Cu/Nb thin films of several repeat lengths and thicknesses have been studied using temperature dependent resistivity, transmission electronic microscopy (TEM) and X-ray absorption fine structure (XAFS) measurements. We investigated any possible structural change inside the Cu layer by using XAFS measurements which indicated that the local structure around Cu sites remains FCC-like even for the shortest bilayers period. Also, we obtained the grains size by using TEM measurements so that we could evaluate the scattering due to the grain boundaries. Our $\rho(T)$ measurements seemed to be related to the layers thickness of the thin film rather than the total thickness, and can be successfully compared to theoretical results using a model first proposed by Dimmich[1]. We found a clear correlation between fine structure length scales (grain size and layer thickness) and macroscopic properties (resistivity data). [1] R. Dimmich, J. Phys. F, Met. Phys. 15 (1985) 2477.

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