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Superconducting Properties of Nb/Ni Bilayers TIMOTHY AHRENHOLZ, EMILY DAVIS, PHILLIP BROUSSARD, Covenant College — We grew Nb/Ni bilayers in order to observe their behavior as it compares to Usadel theory. The bilayers themselves were grown in a magnetron sputtering system, each consisting of a 33 nm film of Nb and a 0-7 nm film of Ni. These films were deposited on Si wafers. Measurements of the thicknesses of the films were performed with a contact profilometer. We measured the transition temperatures (T_c) of the films by cooling them as low as 5 K in a Janis Cryocooler. We measured the T_c with four different methods to insure accuracy: resistively, inductively, through third harmonic analysis, and resistively from upper critical field measurements. The T_c with respect to Ni layer thickness for each of these measurements seemed to confirm Usadel theory's predictions to a great extent. In the case of the resistive measurements, the T_c dropped from 8.31 K to 6.66 K as the thickness of Ni went from 0 nm to 0.48 nm, but then it rose to 7.28 K as Ni thickness reached 3.97 nm, and thereafter remained constant. This pattern of behavior was evident across each of the measurements of T_c.

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