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Inductive Critical Currents in Mo/Nb layered structures[1] PHILLIP BROUSSARD, DAVID MYERS, JAMES VELDHORST, Covenant College — We have carried out measurements of inductive critical currents in Mo/Nb layered films. The films were grown by magnetron sputtering onto silicon substrates from separate sources. We grew films with the structure $(N/S)^m$, where the Mo/Nb bilayer is repeated m times. Here the base bilayer unit is composed of a Mo layer 36.9 nm thick and a Nb layer 43.2 nm thick, while m varies from 1 to 4. The films grow with (110) orientation, as expected for bcc materials. Inductive critical currents were measured using a third harmonic technique, while superconducting transition temperatures (T_c) were measured both resistively and inductively. The films were cooled by a cryocooler down to temperatures of approximately 6 K. We find the T_c and the critical current density (J_c) are nearly independent of m. J_c varies as $(1-t)^{3/2}$ as expected from Ginzburg-Landau theory (here t is the reduced temperature, T/T_c). Measurements of J_c have also been made in low magnetic fields, and will be discussed.

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