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Inductive Critical Currents in Nb/Ni bilayers PHILLIP BROUSSARD, EMILY DAVIS, TIM AHRENHOLZ, Covenant College, Lookout Mtn, GA 30750 — We have carried out measurements of inductive critical currents in Nb/Ni bilayers. The films were grown by magnetron sputtering onto room temperature silicon substrates from separate sources. The bilayers were composed of an initial 33 nm Nb layer followed by a Ni layer, which was varied from 0-7 nm. Inductive critical currents were measured using a third harmonic technique at 1 kHz. J_c varies as $(1-t)^\gamma$ with γ being 3/2 as expected for pure Nb films, but decreasing as the Ni layer is increased (here t is the reduced temperature, T/T_c). Our pure Nb film had a T_c of 7.7 K with an inferred $J_c(0)$ of 61 MA/cm^2. As the Ni layer is increased, we see a marked reduction in the critical current which continues as the Ni layer is increased. Unlike the T_c's for these samples, we do not see nonmonotonic behavior in the critical current, with $J_c(0)$ reducing to a constant value as Ni thickness goes beyond 3 nm.

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