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B7.8 THE EFFECT OF PRESSURE ON VOLUME AND SURFACE CRITICAL CURRENTS OF Nb. N.B.Brandt, E.Papp, and B.A.Ratnam. Moscow State University, Moscow, U.S.S.R.

The influence of hydrostatic pressures p up to 16 kbar on volume and surface critical currents of monocrystalline Nb in magnetic fields H and at temperature T = 4.2° K has been investigated. Harmonic analysis measurements were made at modulated (frequency ν = 120 c / sec, amplitude h ~ 10 ~ 50 Oe) stationary (or sweep) H fields. Above H_{c2}, which monotonically decreases with p as ~ 10 Oe / kbar, surface critical currents reversibly fall with p : at p = 15 kbar being ~ 50 % lower. T_c up to p = 16 kbar is unchanged to within 0.1° K.

For sufficiently large h, 1st and 3rd harmonics as f(H) exhibit minima (peak effect), whose positions, analogous to H_{c2}, decrease with p. Below H_{c2} the harmonics as f(h) are close to zero for h less than a threshold and quadratic in h for h greater than the threshold. We identify this h threshold with a surface critical current, and the quadratic dependence with a volume flux penetration corresponding to the sample's volume critical current. Below H_{c2} this surface critical current decreases monotonically with H while the volume critical current exhibits a maximum. This suggests that the peak effect is determined by a volume flux penetration mechanism. The volume critical current is found to have a complicated p dependence.