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Magnetic Instabilities along the Superconducting Phase Boundary of Nb/Ni Multilayers[1] WENTAO XU, AMISH JOSHI[2], SERGIY KRYUKOV, LANCE DE LONG, University of Kentucky, ELVIRA GONZALEZ, ELENA NAVARRO, JAVIER VILLEGAS, JOSE VICENT, Universidad Complutense Madrid — We report vibrating reed and SQUID magnetometer data that exhibit prominent cusps or oscillations of the SC onset temperature, $|\Delta T_C(H)| \approx$ 0.01 to 0.7 K, for a $[Nb(23nm)/Ni(5nm)]_5$ multilayer (ML) in DC magnetic fields applied nearly parallel to the ML plane. The vibrating reed data exhibit additional structures below T_C that may mark multiple SC transitions or vortex lattice rearrangements within the ML. This striking behavior would then pose new challenges for theoretical and experimental investigations of SC/FM interfaces that involve "pi phase shifts" of the SC order parameter and exotic ("LOFF") pairing states. Alternatively, the anomalies may signal dynamical instabilities within a confined, strongly anisotropic Abrikosov vortex lattice.

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