

Experimental investigations of 0- and pi-state coexistence in Josephson SFS junctions

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We have fabricated and investigated in detail SFS π -junctions (Nb-Cu/Ni-Nb) with high critical current density up to 10^4 A/cm² that are suitable for possible applications as elements of digital and quantum logics. SFS junctions with a small enough F-layer transition thickness were fabricated which manifest a very sharp transition to the π -state. At the point of the $0 - \pi$ -transition the persistence of the second $\sin(2\phi)$ component of the current-phase relation was detected directly by means of a one-junction interferometer technique. Half-integer Shapiro steps and half-flux-quantum period of Fraunhofer pattern were also reliable evidences of the 2ϕ component supercurrent flow observed at $0 - \pi$ transition temperature.