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Harmonic current-phase relation in Nb–Al-based superconductor/insulator/normal conductor/insulator/superconductor-type Josephson junctions between 4.2 K and the critical temperature

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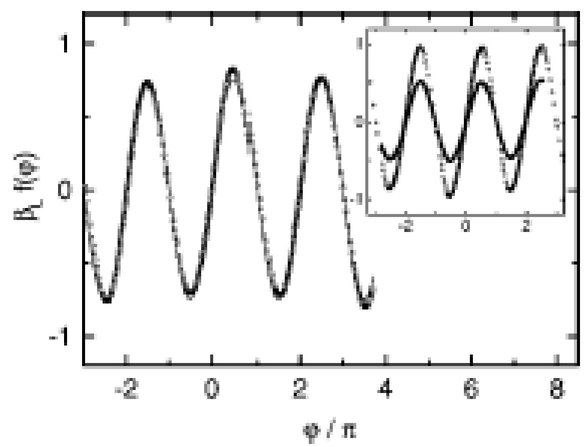

FIG. 3. CPR of sample No. 1 at 6.75 K and the harmonic fit. The inset shows the CPRs at 5.75 K (open dots) and 7.25 K (filled dots). From the extremes of the curves we obtained β_L values of 0.75 ± 0.04 for the first and 0.93 ± 0.04 or 0.50 ± 0.02 for the latter two, respectively. The standard deviation of β_L gives a measure of the accuracy of the experiment.

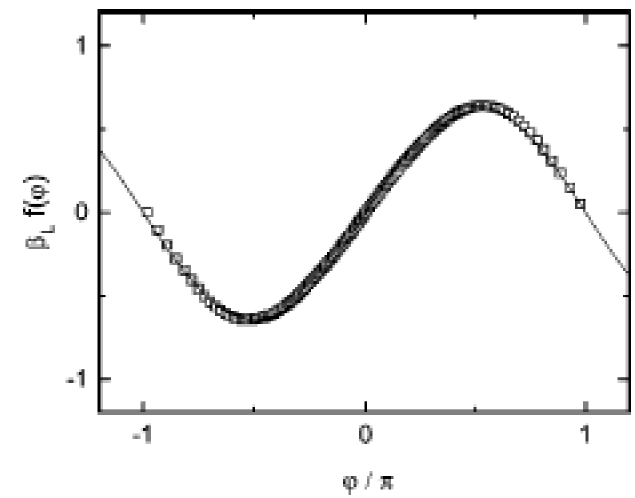

FIG. 4. CPR of sample No. 2 at liquid helium temperature. The line represents the harmonic fit for $\beta_L=0.64$.

$$\beta_L f(\varphi) = \frac{2\pi L I_c}{\Phi_0}\sin(\varphi)$$

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Temperature dependence of the current-phase relation for $YBa_2Cu_3O_{7-x}$ step-edge Josephson junctions

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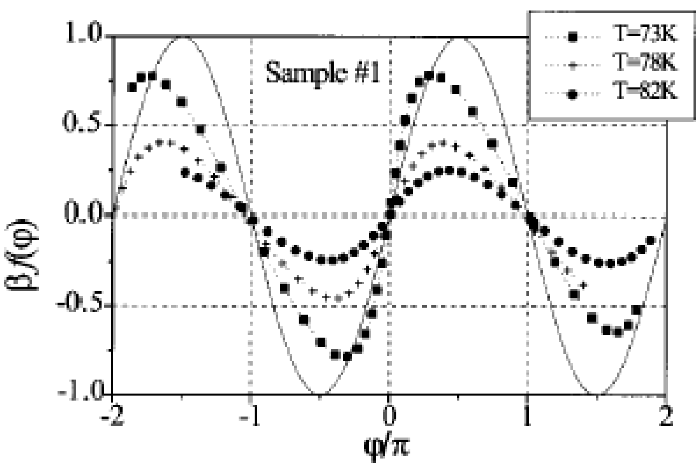

FIG. 1. Current-phase relation $\beta f(\varphi)$ for sample No. 1 at various temperatures (symbols). sin φ (solid line) is shown for comparison.

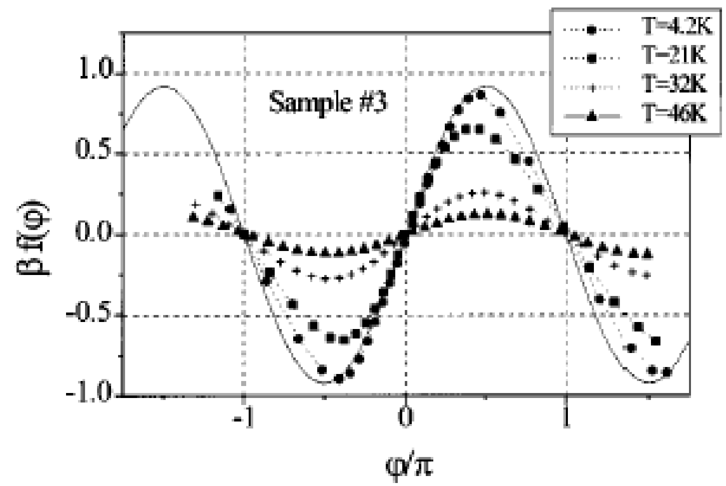

FIG. 2. Current-phase relation $\beta f(\varphi)$ for sample No. 3 at various temperatures (symbols). 0.92 sin φ (solid line) is shown for comparison.

Non-sinusoidal f(ϕ) due to d-wave symmetry of the order parameter
And faceting of the Josephson junction interface

Nonsinusoidal Current-Phase Relationship of Grain Boundary Josephson Junctions in High-T_c Superconductors

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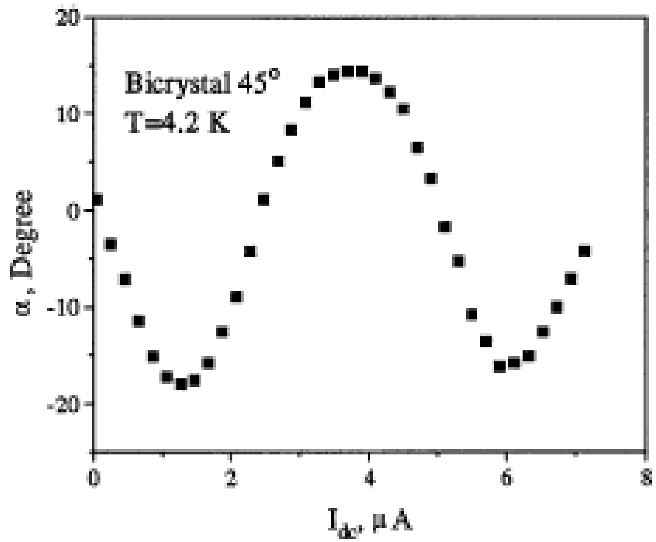

FIG. 2. Phase angle α between the driving current and the output voltage measured at 4.2 K as a function of the dc current I_{dc}, for an $YBa_2Cu_3O_{7-x}$ single junction interferometer circuit containing a symmetric 45° [001]-tilt grain boundary.

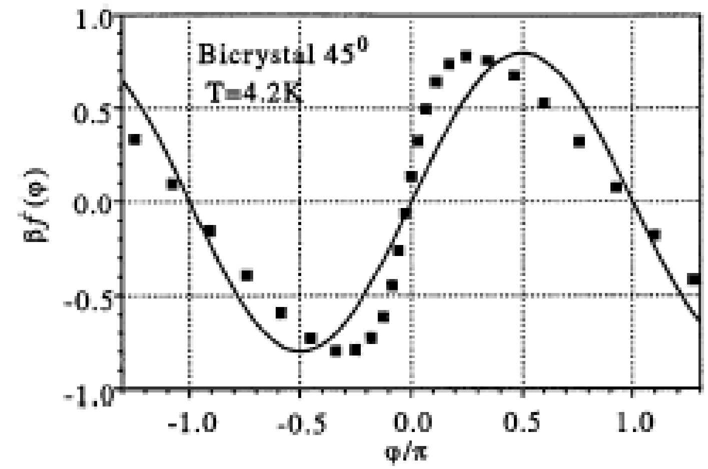

FIG. 3. The normalized current through the junction $\beta f(\varphi)$ as a function of the phase difference φ restored from the measured $\alpha(I_{dc})$ as shown in Fig. 2. For comparison, the function $\beta \sin(\varphi)$ with $\beta = 0.8$ is plotted as a solid line.

Non-sinusoidal f(ϕ) due to d-wave symmetry of the order parameter
And faceting of the Josephson junction interface