Quantum oscillations in a superconducting bismuth nanowire

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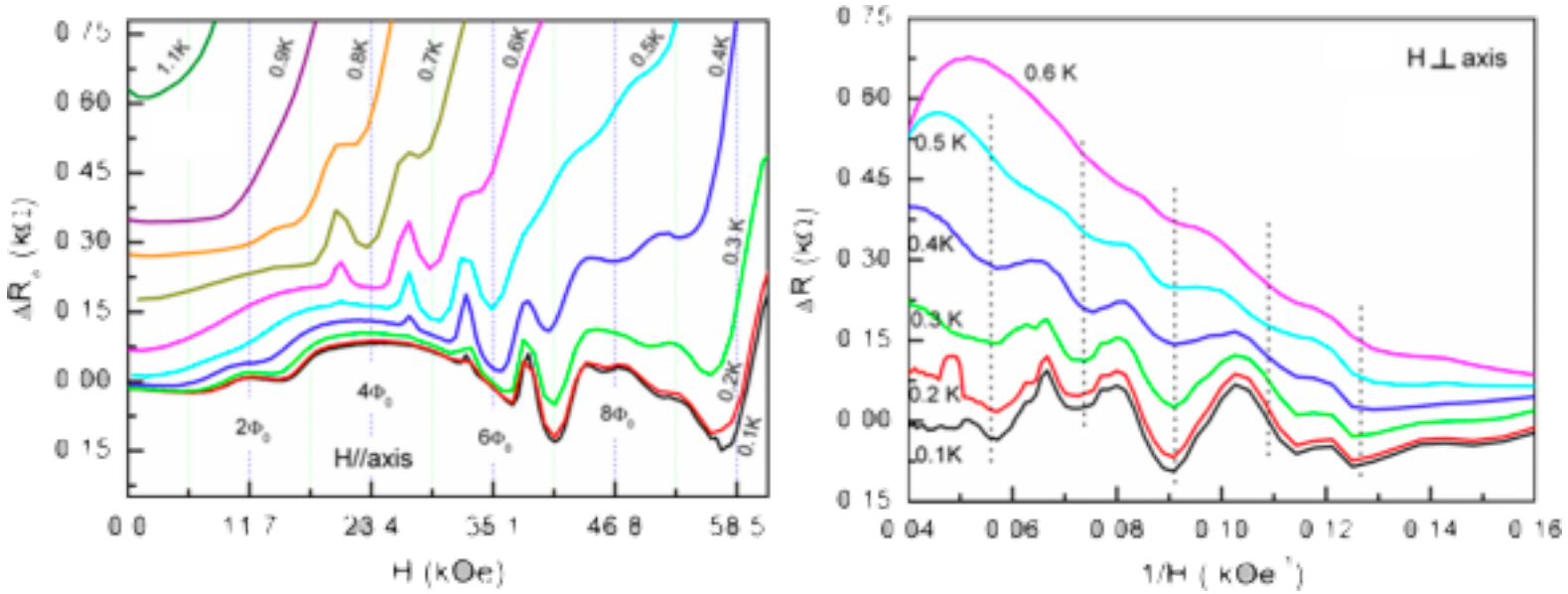

In contrast to bulk bismuth, crystalline bismuth nanowires are superconducting below 1.3 K. The residual resistance of a 72 nm wire at low temperature displays oscillations periodic in the parallel magnetic field H, with a period correspond to the superconducting flux quantum (left). This Little-Parks-like effect suggests that superconductivity originates in a surface shell on the wire. When H is perpendicular to the wire axis, the resistance shows oscillations with a 1/H periodicity typical of fermionic systems (right), indicating a novel coexistence of fermionic and bosonic states.