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Observation of Little-Parks Oscillations of the Kinetic Inductance at Low Temperatures Using a GHz Resonator with Two Parallel Superconducting Nanowires[1] ANDREY BELKIN, MATTHEW BRENNER, THOMAS AREF, JASEUNG KU, ALEXEY BEZRYADIN, University of Illinois at Urbana-Champaign — Little-Parks (LP) effect manifests the phenomenon of the fluxoid quantization in doubly connected superconductors. Usually it is observed at high temperatures, i.e. slightly below the critical temperature (Tc). We demonstrated that a thin-film Fabry-Perot superconducting resonator with a pair of nanowires inserted at the point of supercurrent antinode can be used to reveal LP effect even at temperatures much lower than Tc. As magnetic field (H) is applied, the Meissner current develops, changing the kinetic inductance of the wires and, correspondingly, the resonance frequency of the resonator and its transmission S21 measured at the fixed frequency. The periodicity of the LP effect is revealed as a periodic set of distorted parabolas S21(H) corresponding to the states with different vorticities. The transition from one state to another corresponds to a Little's phase slip. We suggest a theoretical explanation to the shape of the observed parabolas. We also report a statistical analysis of the jumps between the parabolas.

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