

## The critical state of a superconducting ring caused by a current

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Distribution of a current in a ring from niobium consisting asymmetric on critical current and inductance branches when the transport current through one of branches reaches critical value is experimentally investigated. At achievement of a critical state of one of branches the distribution has view of low-frequency self-oscillations of a current into branches at a constant transport current through the ring or the distribution is characterized by occurrence in other branch the current in steps changing in process of increase of transport current through a ring, since its value equal to a critical current of a branch with its smaller value. Conditions of the first type current state of a ring are macroscopical value of length of its both branches and presence in one of branches local "weak" region with the lowered critical current. A condition of a state of the second type is presence in a ring a branch with microscopic length (the order of coherence length of the superconductor) and with smaller a critical current, than for other macroscopical branch with critical current <sup>1</sup>. The "weak" branch region has been received by local etching Nb microwire. Microscopic branch represented clamping contact Nb - Nb, formed by imposing of ends Nb microwire against each other and their compression. The reasons of two types of current distribution are discussed.

<sup>1</sup>V.P. Koverya, S.I. Bondarenko, A.V. Krevsun, N.M. Levchenko and I.S. Bondarenko, Low Temp. Phys. **36**, 605 (2010).