

Brain like artificial neural networks based on superconducting elements

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Abstract

Energy efficiency and the radically reduction of the power consumption level becomes a crucial parameter constraining the advance of supercomputers. The most promising solution is design and development of the non-von Neumann architectures, first of all – the Artificial Neural Networks (ANN) based on superconducting elements. Superconducting ANN needs elaboration of two main elements – nonlinear switch element [1] (neuron's core structure - S/F/S Josephson Junction is shown in Fig.1), and linear connecting element synapse [2]. We present results of our design and investigation of superconducting spin-valves and superconducting synapse, based on layered hybrid structures superconductor-ferromagnet.

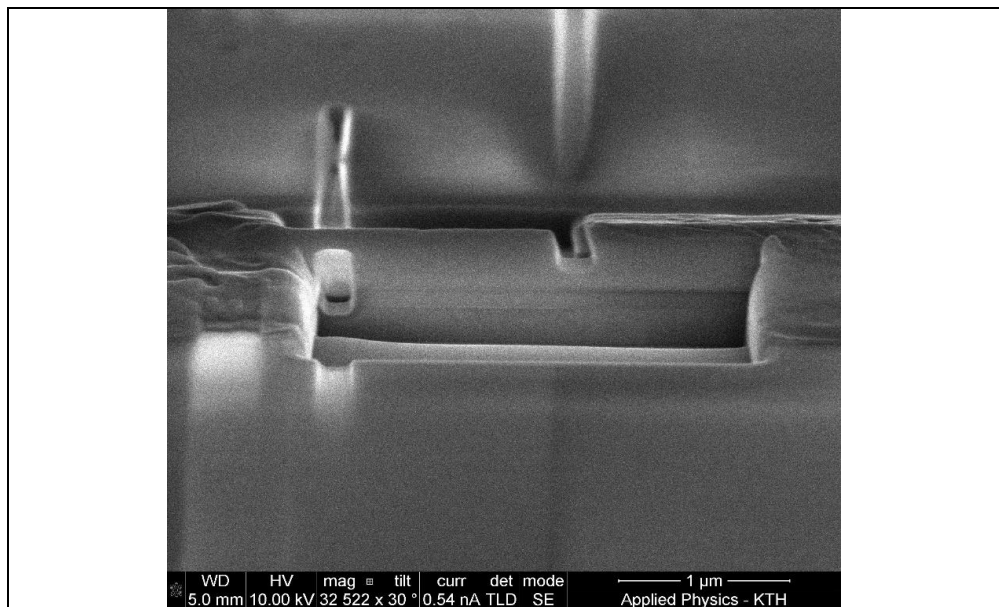


Fig.1 S/F/S Josephson junction – base element of the superconducting Gauss neuron

Bibliography

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