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(54) Title: JOSEPHSON MAGNETIC SWITCH

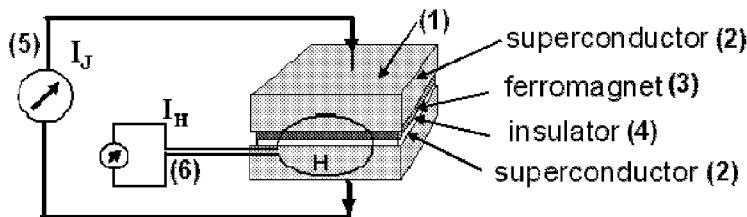


FIG. 1

(57) Abstract: New type of Josephson switch based on Josephson superconductor/insulator/ferromagnet/superconductor (SIFS) junction is disclosed. This Josephson SIFS junction has a ferromagnetic (F-) barrier whose magnetization can be controlled by magnetic field pulses. The critical current of such SIFS junction can be controlled using the remanent magnetization of the junction ferromagnetic (F-) barrier. The proposed Josephson magnetic SIFS switch exploits a weakly ferromagnetic (F-) thin-film inner layer with in-plane magnetic anisotropy and small coercive field (for example, Pd_{0.99}Fe_{0.01} -thin-film barrier). A Nb- Pd_{0.99}Fe_{0.01}-Nb SFS sandwich can be switched between two states of Josephson critical currents or between zero-resistance and resistive states by magnetic field pulses. It is important that the critical current states remain unchanged for a sufficient length of time at low temperatures without any applied magnetic field. The proposed Josephson magnetic switch can be used as a switching element or as an element in memory devices compatible with superconducting Single Flux Quantum digital circuits.



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A. CLASSIFICATION OF SUBJECT MATTER**H01L 39/22(2006.01)i**

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

H01L 39/22; H01L 39/00; H03K 17/92; H02M 7/02

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & Keywords: Josephson, magnetic, switch, SIFS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	T. Kontos et al. Josephson Junction through a Thin Ferromagnetic Layer: Negative Coupling. Physical Review Letters. 23 September 2002, Vol.89, No.13, pages 137007-1 - 137007-4. See pages 137007-1 - 137007-4 and figure 2.	1-6
Y	US 4626701 A (HARADA YUTAKA et al.) 02 December 1986 See abstract, column 2, line 17 - column 3, line 11, and figures 1,2B.	1-6
A	US 7619437 B2 (THOM MURRAY et al.) 17 November 2009 See abstract and claims 8,9.	1-6

 Further documents are listed in the continuation of Box C. See patent family annex.

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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