PriMera Scientific Engineering
Volume 4 Issue 3 March 2024
DOI: 10.56831/PSEN-04-116
ISSN: 2834-2550

PriMera Scientific Publications

Semiconductors of the Future: Transducers and Selectors of Universe Electromagnetic Energy

Type: Short Communication
Received: January 25, 2024
Published: March 06, 2024

Citation:
Francisco Bulnes. "Semiconductors of the Future: Transducers and Selectors of Universe Electromagnetic Energy". PriMera Scientific Engineering 4.3 (2024): 54-56.

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The true and real development of the electronics comes with the research on semiconductors, which represent the interphase of all electronic transformation in any material state, even gas state and the interacting with the characteristics and qualities of the environmental and nature ambient to control an electromagnetic fields and produce enough electromagnetic energy, since electric fields can affect semiconductings properties, generating different electric potentials, spin currents, dosage of super-electrons (or Cooper pairs [1]), ionic concentration or even to obtain derived products (in the photon level) from an electromagnetic plasma as different fermion species, even the Majorana fermions structuring the conductor materials according their superconductivity. Although also, the semiconductors are that unique conductor class that acts as either insulator or conductor, depending of the electronic saturation, its interaction with the environmental factors, such that temperature, light, electric currents, magnetic fields, or even humidity. The Universe is a superconductor, and this is there to be used through devices that control and modify its supercurrents.

In last dates, inside the research on advanced electronics of superconductors, the following proposition has been established [2].

Lemma 1. A semi-conductor can be modified to be superconductor. But not vice versa.

Here has been proved that in a semiconductors, we have that the forbidden gap between valence band and conduction band is very small. It has a forbidden gap of about 1 electron volt (eV). Then never a superconductor will be semiconductor as such. Although only under special physical conditions some elements as Germanium can to host superconductivity. But as intrinsic elements not happen.

The before establish a sufficient condition to the electronic transformation in a SM-SC, which from these combinations in the corresponding sandwich we obtain the best control of a superconductor, the possibility to obtain a superconducting plus, or even the incorporation of a third element as a topological insulator to polarization specific effects [3].

Pure semiconductors are not superconductors. The superconducting condition is achieved when the doping is used. Doping occurs when an element in the semiconductor is replaced by a small percentage of an element in another column of the periodic table, or when a partially ionic semiconductor is prepared with a deficiency of one of the elements in the compound, for example in the R. M. Lutchyn, J. D. Sau, and S. Das Sarma's heterostructures [4]. As was established in the lemma 1, a semi-conductor can be modified to be superconductor. For others characterizations depends of type of semiconductor, topological insulators used, ceramics, or nano-carbons combinations with special geometrical structures, for example in the obtaining of TBT-nano transformations of the space required. In this respect, to field observables are very useful, realizing precise measures of these observables, such is the case to detect the field torsion, a field observable very complicated to detect and measure experimentally [5].

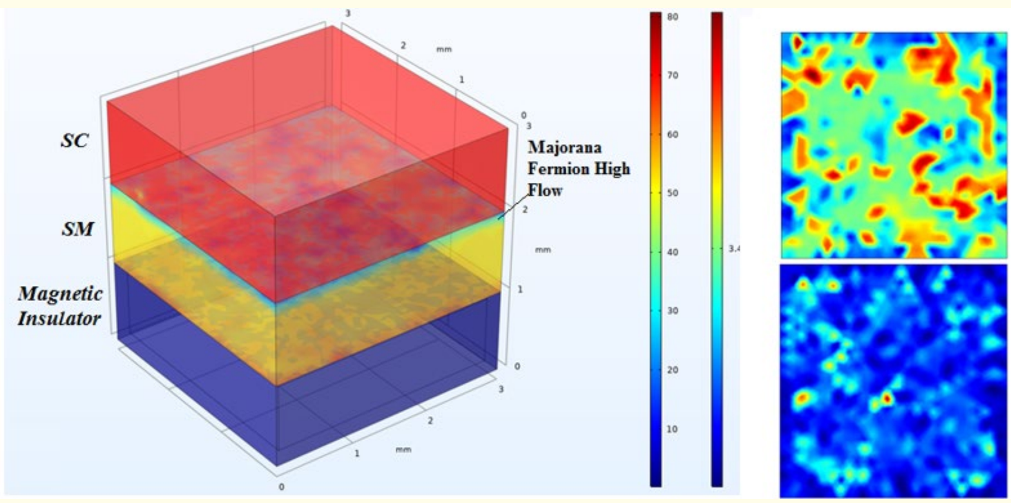

Figure 1: A. Three junction SC-SM-I. The Majorana Fermions flow is improved and generated by the presence of a magnetic insulator. B. Concentration of holes (superior sample) in the superconductor-semiconductor patron. In the inferior sample is showed the electron flow in semiconductor-topological insulator patron. All these experiments and numerical modeling are in superconductivity goals.

The modern techniques to characterize a semiconductor are focused in the characterization of a particular semiconductor material or device (PN junction, Schottky diode, solar cell, etc.) with extra or plus properties. Semiconductor properties that could be characterized include the depletion width, carrier concentration, carrier generation and recombination rates, sandwich characterization (in this direction the sandwich of the recombination could be with high production of ions and combination with special insulators [6]), carrier lifetimes, defect concentration, and trap states. In all they the principle is the same from a scientific point of view can to create through of matrix blocks the superposing wave function (spinors) obtained by ortho-normality in the decomposition of the Hilbert space solution (with sub-blocks defined by the state matrices in sub-spaces) as:

$$\mathbb{H} = H_1 \oplus H_2 \oplus \ldots \oplus H_n,$$

where the solution is a wave-signal which establish a regular behavior in signals and systems, even where could have a quasi-inexistent charge or a big current, even supercurrent. Remember that the successor of silicon-based MOSFETs [7] due to its wide-bandgap properties like high voltage blocking, and high switching frequencies, are the semiconductors. The wave functions can be generated to any electromagnetic component inside device that characterizes the semiconductor element (for example of the scalar magnetic potential signals obtained in its interphase with a magnetic insulator). The last years the research on semiconductors are focused in their interaction with the light with the laser technology and the implementations of advanced sensors and transducers which search substitute the big spent from the transformers and inductors used in different transformations of scalars or environmental magnitudes such that temperature, pressure, humidity, luminescence, etcetera, for example to produce an electric potentials to use in satellite trips (for example "the Curiosity"), where process in caloritronics obtained electromagnetic potentials from the big difference of temperature in the exterior space capable to feed the Curiosity transportation ship until Mars. The principal components were semiconductors of different types.

Securely, in the future and due the importance of these components, the nationalization of semiconductors will be a way to control in a wide margin the future technology, which depends of the fabrication and development of semiconductors or news semiconductors with more properties. Likewise, the governments could take control or ownership of semiconductor manufacturing facilities or companies.

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