Efficiency and perspectives of obtaining the stimulated effect in the optical range by means of nuclear radiation and the stimulated effects in the nuclear radiation field

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The stimulated effects predicted in the optical region in the third decade of this century, undervent a sudden development since the sixth decade. By expanding the range of the wave lengths from gamma-raser to I raser several notions of the regions of electromagnetic spectra were unified, which, hitherto existed theoretically as a unigue region.

This extenion developed in two directions, first the expanding of the frequency diapason on which the stimulated quantum generators operate, and second obtaing new ways for population inversion. Through the obtention of the stimulated effects in nuclear radiations, a possibility was created for coherent gamma and X-sources. On the other hand, the nuclear radiations, protons, neutrons, and gamma rays were used for achieving the stimulated effect in the spectrum of optical range. These two groups of problems are parallely considered and the possibilities of their realization are compared, through effects used and the technical performances of various equipment.

Quantum electronics and nuclear physics are many-sidedly diametrally opposite (in theory and experimental techniques). However, there are a lot of adjacent or identical points of observation.

At the presentday developmental level, both sciences, having in view the large possibilities of both disciplines, (trough multidisciplinary in nature) have several common directions in which both of them are interested. The interpenetration of these scientific fields is reflected in the attempts and papers to obtain the stimulated effects in the domain of nuclear physics (which is partially realized) as well as in the papers to support the phenomena of other diapasons from quantum electronics by the nuclear radiation effects. Thereby theories (without which the entire quantum electronics could develop) become more complex due to new approaches. A particular region of the quantum generator application involves purely nuclear phenomena (fusion, fission, isotope enrichment).

In the energy sens, the obtaining of stimulated effects (where neutrons, protons, electrons are used as pumps for the active material) is understood as the energy conversion of one frequacy domain into another, lower, i.e. qualitatively higher from of the coherent energy.