

# THE ZHADIN EFFECT: A NON THERMAL MECHANISM OF INTERACTION BETWEEN MAGNETIC FIELDS AND LIVING MATTER

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## ABSTRACT

Since eighty years the effect of weak ELF magnetic fields on living organisms has been investigated [C.F. Blackman et al. 1985 ].

In order to have a simple physical model Zhadin and collaborators [1998] have introduced a non biological system made up by an aqueous diluted solution of amino acids (e.g. glutamic acid. GLU) contained in an electrolytic cell where a D.C. voltage is applied. Its value ranges in the same interval of cell membrane potentials (-80 mV); a combination of two parallel magnetic fields, one static, the other alternating is applied orthogonally to the current direction. When the frequency of the alternating magnetic fields matches the cyclotron frequency of the ionized amino acid a very narrow peak appears in the electric current. This effect has been named, in the literature, the Zhadin effect. We replicated the Zhadin's experiment in our facility of the C.N.R. in Rome.

A model for this effect has been suggested in the frame of QED (Quantum Electrodynamics) [E. Del Giudice et al. 2002, M.N. Zhadin and L.Giuliani 2006, L.Giuliani et al. 2008]. Meanwhile another effect, suitable to be modelled in the frame of QED, has reached the attention of the scientific community: the water bridge, discovered by W.G. Armstrong (1898) and now studied by means of modern technology ( E.C. Fuchs et al. 2007-2009). We replicated this experiment too, in our laboratory at Monteporzio Catone (Rome).

When a high voltage (15-25 kV at least) is applied between to two beakers, filled of water, a floating water bridge arises, between them. The bridge, has a diameter of 1-3 mm and it does not collapse when the beakers are pulled apart at a distance (depending on the applied voltage)- from 1.5 to 2.5 cm. Water density decreases while its temperature increases from 20±C to 65±C in a period of about 45 minutes, at the end the bridge collapse.

Authors suggested a basis for a joint explanation of both the effects, based on the quantum physics concerning water. The same basis seems to be common to the effects that authors induced for cell maturing and differentiating [A.Lisi et al. 2004-2008, R.Gaetani et al. 2009].