

*This abstract is for a presentation made an international conference entitled  
"Foundations of bioelectromagnetics: towards a new rationale for risk assessment and management"  
convened by the International Commission for Electromagnetic Safety with cosponsors,  
the Italian Government Worker Safety Program and, Ente Zona, in Venice, Italy, on December 17, 2007,*

### **Abstract**

#### **THE ORGANIZATION OF WATER AS THE BASIS OF THE BIOLOGICAL ORGANIZATION: THE SPECIAL ROLE OF THE ELF MAGNETIC FIELDS**

**Emilio Del Giudice**

It has been shown in recent times that liquid water exhibits a supramolecular organization where large assemblies ( several millions ) of molecules are correlated in phase within " coherence domains " (CD) as large as a thousand of Angstroms. In each CD, molecules oscillate coherently between a ground state where electrons are tightly bound and an excited state where one electron is slightly below the ionization threshold. Thus the coherent fraction of water is able to release electrons easily whereas the non coherent fraction is only able to receive electrons; in other words the coherent fraction is a reducing species whereas the noncoherent fraction is an oxidant. It is possible to show that CD's have a spectrum of excited levels produced by the cold vortices of the plasma of quasi-free electrons; the formation of such vortices demands small excitation energies and the lifetime of such levels is quite long since they cannot decay thermally. The only possible decay channel is the chemical one.

An intriguing possibility is the emergence of a coherence among the CD's that would account for the order of living matter; the emergence of a coherent oscillation of the CD's implies the presence of non-aqueous molecules able to accept the energy output of CD's. Biochemistry thus emerges as a necessary condition of the organization of water. CD's become, in this framework, machines able to transform the ambient low-grade energy into high-grade electron energy able to excite selected molecule species. A peculiar way of injecting energy in the CD's is by moving ions in and out the cyclotron orbits around the CD's by means of the combination of weak magnetic fields à la Zhadin.