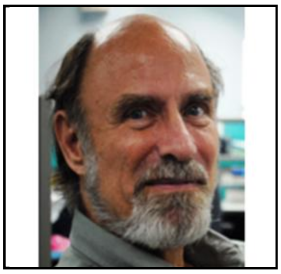
Nuclear-waste remediation with femto-atoms and femto-molecules



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The s-orbits of atomic electrons pass through the atoms' nuclear region in which the kinetic energy gained from the Coulomb potential of the nuclear and electron charges makes such electrons relativistic. The relativistic Schrodinger (Klein-Gordon or K-G) and Dirac equations predict deep electron orbits with radii in the femto-meter range; but, they do not predict how electrons can get there or what happens when/if they do. In prior papers, we have explored the nature of deep-orbit solutions of the relativistic equations [1-4] and of the resulting femto-atoms (and even femto-molecules) [5-7]. One prediction of this model, based on observations from successful cold fusion results and mentioned in several of the above references, is that of hard-radiation-free transmutation. An extension of this important feature is that of the relativistic long-range electromagnetic forces of the deep-orbit electrons [8,9] that can draw a femto-atom or molecule through a lattice to an excited or unstable nucleus.

The selective attraction of the mobile femto-atoms or molecules to radio-nuclides means that, not only transmutation products but, all radio-active materials in the vicinity are preferentially made to decay by multi-particle, but fast, processes. This ability to so neutralize such materials explains some of the outstanding questions about low-energy nuclear reaction (LENR) results, such as why characteristic decay products of observed transmutation products are not seen. It is also a means of further validating the electron deep-orbit model of cold fusion (CF). Presently, the model is only a single possible explanation of observations. If the substrate in a CF-active system is intentionally doped (with specific isotopes and radioactive elements), it should be possible to direct, and thereby determine and quantify details of, both the CF processes and the subsequent transmutation pathways and hard-radiation mitigation. This paper seeks to consolidate and expand our prior material on selective transmutation and nuclear-waste remediation to make suggestions for experimental testing of the proposed model.

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