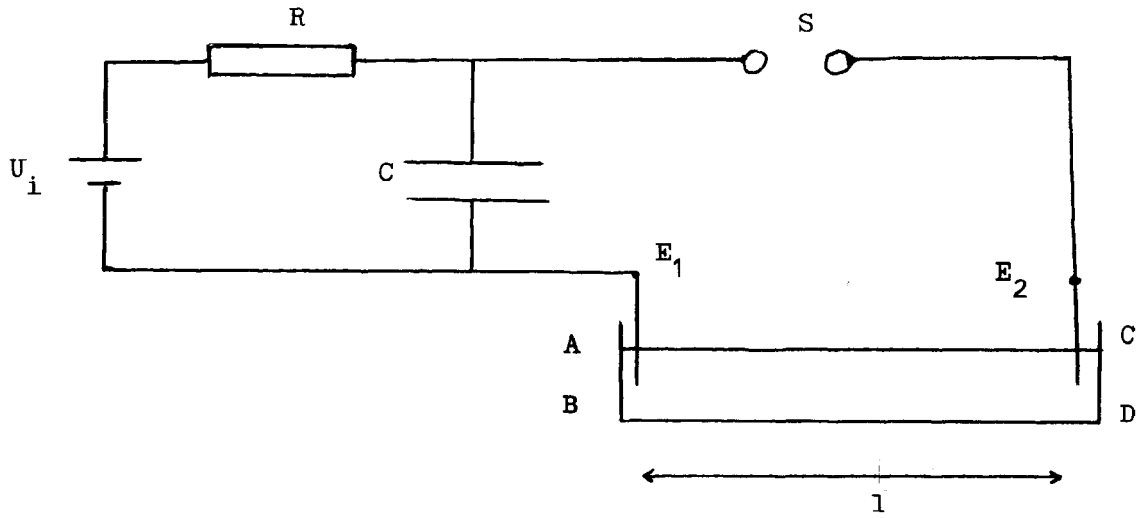

Fig. 1. Current arrives into the electrolytic container through electrodes E_1 and E_2. The spark-gap S in series with the capacitor C allows an impulse excitation. The resistance R in series with the dc power supply U_i controls the frequency of the discharge.

REFERENCES

1. H. HORA, L. CICCHITELLI, G. H. MILEY, M. RAGHEB, A. SCHARMANN, and V. SCHEID, "Plasma and Surface Tension Model for Explaining the Surface Effect of Tritium Generation at Cold Fusion," *Nuovo Cimento*, **12D**, 393 (1990).

2. H. HORA, J. C. KELLEY, J. U. PATEL, M. A. PRELAS, G. H. MILEY, and J. W. TOMPKINS, "Screening in Cold Fusion Derived from D-D Reactions," *Phys. Lett. A*, **175**, 138 (1993).

3. A. POZWOLSKI, "Proceeding and Device for Recovering the Energy of Lightnings," Patent 94 11823, Paris (Oct. 4, 1994) (in French).

4. S. E. JONES et al., "Observation of Cold Nuclear Fusion in Condensed Matter," *Nature*, **338**, 737 (1989).

COMMENTS ON THE POSSIBLE NATURE OF "COLD FUSION" PHENOMENA

At present, it is impossible to ignore some data on strange phenomena designated as "cold fusion." These phenomena are not yet explained.[1,2] It seems to us that the nature of cold fusion may be found in the framework of the modern physics of elementary particles. Almost all theories have predicted a nonzero value for the particle electric dipole moment (EDM) when CP and T violations were discovered. The existence of such particles was absolutely rejected by science before these discoveries.

We think that a fundamental neutral particle with EDM could exist. This particle would create, together with a neutrino, a new long-lived neutral boson compound system with EDM. We named it "eleptino." A number of models for a theory of grand unification predict extremely small masses of the neutral lepton (see Ref. 3). The total number of residual neutrinos in the universe is evaluated as 10^9/proton. The total number of eleptinos may have the same order of magnitude. Assuming that only 1% of all particles are captured in matter, their density in ordinary water would be of the order of 10^{30} cm^{-3}. Such high densities are possible because of the attractive forces of the electric charge in atoms and because of their mutual interaction due to EDM. We do not know the mass and the EDM of the eleptino, but we believe that they are very small.

The natural question of why such densities have never been observed arises. Estimates show that a Bose gas has an extremely low specific heat because of its degeneracy. In spite of the smallness of the proposed properties of the eleptinos, their existence may be checked owing to some collective effects.

Many events in the cosmos and on Earth may be related to the possibility that the eleptinos penetrate into a nuclei because the Coulomb barrier does not stop them.

Probably the cosmic flux to Earth contains the eleptinos together with other Bose particles: residual photons, which were discovered in 1965. We venture to foresee that the events described in the literature about cold fusion and the discovery of gamma-ray flashes of earth origin[4] may be the result of some "exotic" reactions of the eleptinos with nuclei. As a result of the decomposition of an eleptino, the electric charge of nuclei may change. We believe, for example, that the reaction $^2D^+ +$ ept $\Rightarrow {}^2He^{++} + e^-$ may destroy the nucleus of deuterium because $^2He^{++}$ is unstable. This reaction is equivalent to one with neutron decay, $n + \nu \Rightarrow p + e^-$. In the framework of the four-fermion interaction postulated by Fermi for the explanation of beta decay of the nuclei, such a reaction is possible because the creation of an antineutrino and the decay a neutrino make use of the same operator.[3] The reaction $2D^+ \Rightarrow {}^4He^{++}$ discussed in Ref. 5 as a possible explanation of cold fusion phenomena may be related to the eleptinos. The high concentration

of hydrogen ions at electrodes by electrolysis is attributed to the cold fusion phenomena.

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REFERENCES

1. H. HORA, J. C. KELLY, J. U. PATEL, M. A. PRELAS, G. H. MILEY, and J. W. TOMPKINS, *Phys. Lett. A*, **175**, 138 (1993).

2. *Trans. Fusion Technol.*, **26** (1994).

3. L. B. OKUN', *The Physics of Elementary Particles*, Nauka, Moscow (1984) (in Russian).

4. G. J. FISHMAN et al., *Science*, **264**, 1313 (1994).

5. S. R. CHUBB and T. A. CHUBB, *Fusion Technol.*, **24**, 403 (1993).