Comments on Draft Paper, *Theoretical Standard Model Rates of Proton to Neutron Conversations near Metallic Hydride Surfaces,* Dated September 25, 2007

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Comments Submitted by Rod F. Gimpel December 1, 2007

I read the paper on connecting planes from Philadelphia to Spokane, Washington. I think it is a good effort. I don't believe I have seen so many equations and relationships in twelve pages of text. Obviously, the hours spent reading the paper on the plane does not do the paper justice. Even so, I have some comments.

Comment 1

My first comment has to do with FIG. 1 and the nuclear reaction presented in the paper:

$$e^- + p^+ \rightarrow n + \nu_e \qquad \text{(Equation 1)}$$

The most commonly known form of proton-neutron interaction is *beta decay* or the disintegration/decay of a neutron as presented in Figure 1 (page 3 of comments). When a neutron disintegrates into a proton (a process called *beta decay*) the only thing that changes is the flavor of the quark. A quark changes from a *Down* (d) to an *Up* (u) quark with an electron (e^-) and an antineutrino ($\bar{\nu}_e$) coming out. The disintegration process is thought to involve the formation of a very massive particle called the *w-intermediate boson*.[1] The equation for the disintegration of the neutron is presented in Equation 2.

$$n \rightarrow e^- + p^+ + \bar{\nu}_e \qquad \text{(Equation 2)}$$

Notice that three particles are produced from a neutron. They are an electron, proton, and an antineutrino[2]. This is an exothermic reaction. The concern is: if a neutron produces three particles, then the reverse reaction should also involve three particles and be endothermic. This is a Three-Particle Theory proposed in my master's thesis [1], U.S. Invention Disclosures [2, 3], and U.S. patent [4, 5] for the production of excess energy near metal hydride surfaces nine years ago. Figure 2 shows a simpler Feynman space-timeline type diagram for the decay of neutron shown in Figure 1. This figure is to be used for comparison of the conversion of a proton shown in Figure 3. The problem with three-particle reactions is getting three particles together at the same time or approximately the same time. This is especially difficult with neutrinos (or antineutrinos) since they are so elusive and don't want to react with matter. Even so, Figure 3 does involve the reaction of a third particle, the antineutrino. However, this antineutrino is supplied by a pair of virtual particles born in the vicinity of the electron to allow formation of the W-particle. The virtual neutrino is now left without its pair partner. It must then absorb energy from its surroundings supplied by the experiment (plasma experiment, etc.) to become *real* and continues on its journey as a newly created neutrino. *The reversible relationship of neutron production to neutron destruction needs to be addressed. Likewise, the need for a third particle in the reaction needs to be addressed to give the paper credence.*

[1] Richard P. Feynman, *OED – The Strange Theory of Light and Matter*, Princeton Science Library.
[2] I have a hard time keeping my neutrinos, antineutrinos, Up quark, and Down quark straight. But, I don't think I am along. I see others making the same mistake. I often think this is because the antineutrino is often shown as a neutrino traveling backwards through time in Feynman space-time diagrams, etc.

Comment 2

My second comment has to do with Section D, *Driven Oscillations*, of the report. This section implies that the temperatures created by hot spots in the of plasma type experiments are required to produce the types of energy required for nuclear transmutations to happen. This puts the other types of low-energy nuclear reactions research in the defensive. One might consider that the presence of virtual particles, presented in Comment 1, can momentary reduce the energy requirements for reactions to happen. Such a concept allows only a momentary creation of a neutron, but a temporary neutron allows greater penetration into the nucleus of host atom and greater chances of transmutation happening. Then when payback is needed, the virtual particle(s) can take energy from transmutation reactions that take place and become real particles.

Reference Cited in Comments and Figures That Follow

[1] R. F. Gimpel, *Development of Processes to Produce Excess Heat*, Masters Thesis, University of Findlay, Findlay, Ohio, April 1998. Dr. Ken Brown Advisor.

[2] R. F. Gimpel, *MultiCell Reactors,* U.S. Patent Office Disclosure Document No. 437867, filed May and stamped June 12, 1998.

[3] R. F. Gimpel, *Surface-Flux MultiCell Reactors*, U.S. Patent Office Disclosure Document No. 454163, filed February and stamped April 15, 1999.

[4] R. F. Gimpel, *MultiCell Reactors,* U.S. Patent Office Patent Application No. 09/597,650, June 20, 2000.

[5] R. F. Gimpel, D. J. Cravens, J. S. Frick, V. F. Golubic, and Dennis G. Letts, *MultiCell Reactors*, U.S. Patent No. 6,723,946, April 20, 2004.

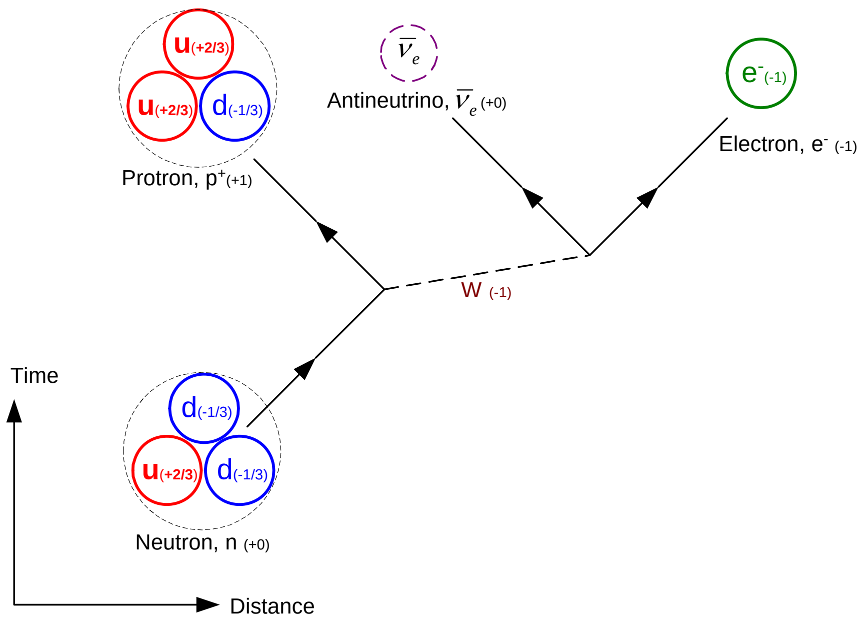

Figure 1 Decay of a Neutron

When a neutron disintegrates into a proton (a process called *beta decay*) the only thing that changes is the flavor of the quark. A quark changes from a *Down* (d) to an *Up* (u) quark with an electron (e^-) and an antineutrino ($\overline{\nu}_e$) coming out. The disintegration process is thought to involve the formation of a very massive particle called the *w-intermediate boson*.

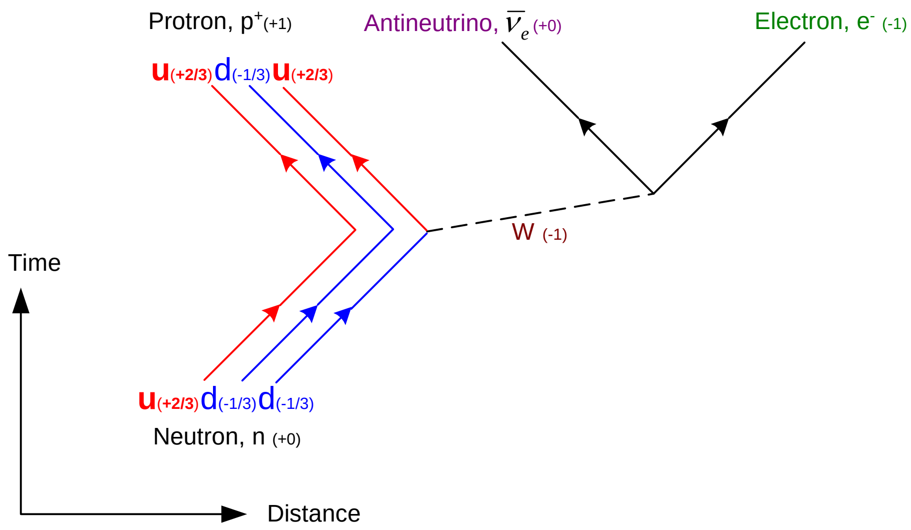

Figure 2 Decay or Destruction of a Neutron – Feynman Diagram

This figure shows a simpler Feynman space-timeline type diagram for the decay of neutron shown in Figure 1. This figure is to be used for comparison of the conversion of a proton shown in Figure 3. Notice that there are *three* particles produced from the destruction of a neutron -- they are an *Up* (u) quark with an electron (e^{-}) and an antineutrino ($\bar{\nu}_e$).

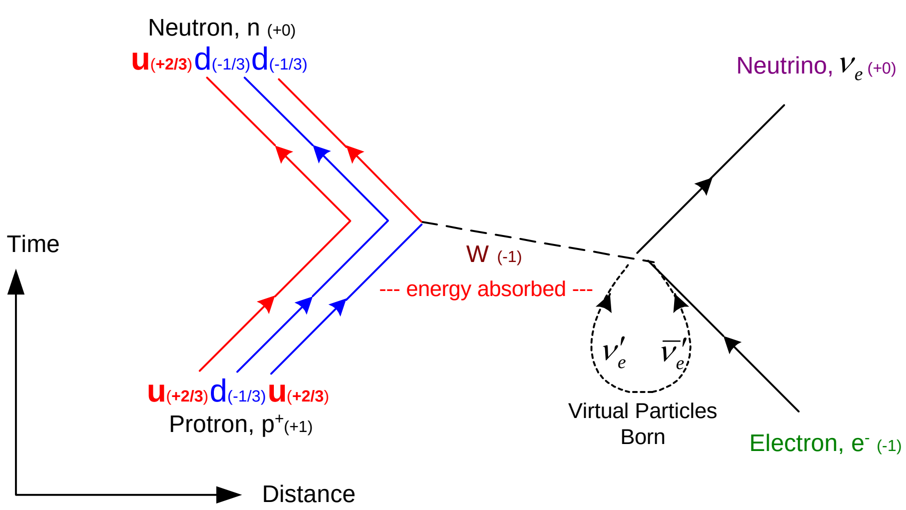

Figure 3 Conversion of a Proton to a Neutron – *Three Particle Theory*

Reason implies that if the destruction of neutron produces a *Up* quark, electron, and an antineutrino, then the production of a neutron should be the reverse reaction. Since the destruction of the neutron (or commonly known as *beta decay*) is an exothermic reaction, the reverse reaction (production of a neutron) should be endothermic. The *Three Particle Theory*[3] shows the reverse reaction. *Real* neutrinos are elusive and not available but the birth of *virtual* particle pairs supplies the needed antineutrino. Absorbed energy allows its paired neutrino to become real and separate.

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[3] First proposed by Rod F. Gimpel in master's thesis early 1998 [1]. Then submitted in US Patent Office Disclosure Documents in May 1998 [2, 3] and February 1999 for US Patent filed June 2000 [4] and granted April 2004 [5]. Similar figures and descriptions were presented in thesis, disclosures, and patent application.