Dual Electron Catalyzed Fusion

Horace Heffner December 2004

If a pair of deuterium hydrinos fuse, or if two electrons are involved in D + D catalysis, without the electrons "falling into the Coulomb well" and thus gaining kinetic energy, the resulting highly *de-energized* neutral nucleus resulting from multiple quantum wavefunction collapse would be momentarily free to migrate into heavy nuclei. Thus is obtained heavy nucleus LENR without any characteristic gamma or particle signatures.

The quantum wavefunction of a particle is a function that provides by location the probability amplitude for finding a particle. The square root of the probability amplitude is the probability density, the probability of finding the particle per volume of space. The amplitude can be summed over a volume to determine the probability amplitude of the particle being present in that given volume. The Schroedinger equation can be used to compute the wavefunction of a particle or orbital particle system through time.

In some interpretations of quantum mechanics, a particle has no real existence until measured, only a potentiality for existence, its wavefunction. Further its wavefunction extends throughout the universe, but most of its amplitude is located in a small volume. Once the location of a particle is measured, it can have a very specific location. Its wavefunction then has no meaning at all. It is said to be "collapsed". The probability of finding that particle miles away was non-zero before the collapse and exactly zero after the collapse.

When the event of fusion occurs, the multiple wavefunctions of the constituent particles essentially become the wavefunction of a single particle. Fusion then represents an observational event. The wavefunctions of the constituent particles cease to exist per se. Their wavefunctions collapse, and are replaced by a new wavefunction. In this respect, the collapse of the wavefunctions, fusion is an event similar to an observation. A similar collapse occurs at the moment of a tunneling event, and fusion and tunneling may in fact be the same thing.

The wavefunctions of the electron and nucleus of a hydrino share the same center of charge. However, the wavefunction of the electron is spread all over the place, not just located at the center of charge.

The energy of the electron *as a point particle* depends on how close it is located to the nucleus. The closer a point electron is to a point nucleus, the less potential energy the system has. If an electron "falls into the nucleus" it gains kinetic energy equal to

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the potential energy lost by the fall. If a point sized electron could magically be transported to the location of a point charge nucleus without gaining the corresponding kinetic energy, it would take an infinite amount of energy to separate them. Call such a system highly *de-energized*.

As shown in "Electron Catalyzed Fusion"

<http://mtaonline.net/~hheffner/EcatFusion.pdf> in regards to a specific case of electron catalyzed fusion, the electron gains no kinetic energy at all, yet ends up in the nucleus at the conclusion of the fusion. The question remaining at hand: just how big is that fused nucleus at the time of wavefunction collapse? Providing that answer requires experimental work. In fact, the existence of even wavefunction collapse is still an issue of debate.

The presence of electrons in the fused product creates the highly de-energized state. The degree of de-energization at the moment of fusion depends on just how small the de-energized fused particle is upon initial waveform collapse. Given that the product can be string sized, practically a point, essentially all the energy of the reactants is then returned to the vacuum, followed by a permanent energy borrowing to "expand" the product quantum waveforms to normal size. We thus not only have zero point energy (ZPE) fueled atomic expansion, we have ZPE fueled nuclear expansion, followed by atomic expansion of any residual free leptons.

In the case of hydrino fusion, the electrons have a center of charge located at the nucleus center. If the hydrino electron(s) join in the wavefunction collapse, they can be located in the nucleus with no lateral translation of charge whatsoever, and no relative velocity change. Once again the resulting nucleus can end up *de-energized*. Just how de-energized depends on the initial size of the resulting system wavefunction, and other variables listed earlier.

Electrons in compressed orbitals, i.e. with compressed wavefunctions, can essentially reinflate their orbitals to an equilibrium with the ZPE sea, according to Puthoff. Unless the electron(s) are captured by the new nucleus (not feasible in a stable way for either 2H or 4He) they should be free to tap energy from the zero point field (ZPF) and expand to a stable orbital.

In the case of dual electron catalyzed D + D fusion, we have:

D++D++e-+e- ---> He4 * ---> He4+++e-+e-

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The middle step, upon wavefunction collapse to a point, is a neutral He4 particle.

It might be asked exactly why in D + D fusion it could be expected that the hydrino electrons collapse along with the tunneling nuclei. One answer is that it is energetically expected. In superconductors, tunneling of electrons across Josephson junctions is done by pairs more often than singly. When the hydrino nuclei wavefunctions collapse, their individual centers of charge move. It is thus necessary for the centers of charge of the electrons to move similarly, else the tunneling would be energetically denied. Since the two electrons tunnel simultaneously, their total center of charge does not change at all, just like the total center of charge of the nuclei do not move either. The electrons thus exhibit equal but opposite momentum exchanges just like cooper pairs, and thus should tend to tunnel together. The tunneling collapse of the electrons wavefunctions returns potential energy to the ZPF, but that is the very place it long-term borrowed it in the first place.

This of course is all highly speculative, and may even involve mixed metaphors. On the other hand it may provide a useful starting point for analysis under various interpretations in that it makes a bit of common sense regarding some things which otherwise make no sense at all.