Thank you for taking the time to review our neutron synthesis and fusion process. There appears to be a misunderstanding as to its nature.

Your conclusion that the collision of an electron and proton is unlikely to result in neutron formation is absolutely correct, however our process does not involve such collisions. Instead, we form hydrogen atoms with 0 charge, 0.78233 MeV orbital electrons, -1.9135 ½-spin nuclear magnetons, 939.5656 MeV mass, and which decay into a proton, an electron, a 0.78233 MeV energy, and an electron anti-neutrino, in short, synthetic neutrons.

Your conclusion that the Pauli Exclusion Principle prohibits electrons with identical quantum states in the same atom is also correct. However this principle applies to atoms and since neutrons are hydrogen atoms with 0.78233 MeV electrons, the magneton alignment and transmutation of four neutrons into a Helium-4 nucleus with the release of two Beta particles does not violate Pauli's Exclusion since each neutron is a single electron atom. And when the neutrons' ½-spin magnetons align them into a tetrahedron of orthogonal pairs, each pair's magnetons oppose and cancel so all four neutron electrons possess different orbital orientations and quantum states so their transformation into the helium nucleus of an atom does not violate Pauli's Exclusion either.

A 0.78233 MeV orbital electron has equal 0.260777 MeV electric, magnetic and kinetic energy components. By Bohr's hydrogen atom analysis this results in an $r = k_e e^2 / 2E = 2.76136$ fm orbital radius. Alternately, if a "normal" hydrogen atom electron with a 13.6 eV electric energy has a $0.529 \times 10^{-10}$ m radius, an electron with a 260777 eV electric energy has a 260777 eV / 13.6 eV = 19175 times smaller radius, or $0.529 \times 10^{-10}$ m / 19175 = 2.76 fm. And since a 0.78233 MeV electron has a 2.531 greater mass it results in a 2.531 spatial contraction to yield the 2.76136 fm / 2.531 = 1.091 fm observed neutron radius and $m_p + m_e + 0.78233$ MeV = 939.5656 MeV mass.

The Bohr magneton for an electron is $u_B = ½\ e/m_e\ h/2{\cdot}pi$, or ½ the charge to mass ratio times the fundamental angular momentum energy unit, indicating a magneton generated by an orbital charge attenuated by inertial mass. However when this concept is applied to a proton with mass mp, its yields a magneton 2.7928 times less than the actual value. While mass attenuates generation of a magnetic field, lower density mitigates the attenuation, and since a proton has 1836.153 greater mass and 8882 greater volume than an electron, it has a 4.8373 lower density. Because density is 3-dimensional and the magnetic field propagates in 1-dimension the proton's magneton is $4.8373 / 3^{½} = 2.7928$ times larger than the value calculated by the Bohr magneton relation.

The neutron magneton, with a proton center, is not factored by $3^{½}$ since the 2-dimensional orbital and l-dimensional magnetic field are all affected by the 3-d density. However the orbital magneton is generated by a current loop and while the electron has a 2.76 fm local radius independent observers see a radius contracted by 2.531 to 1.091 fm so the magneton is enhanced by a lower proton density and reduced by contraction to 4.8373 / 2.531 = 1.9112. Because the orbital electron is negative the magnetic and angular moments are opposite so the value is -1.9112 nuclear magnetons. This value is (1.9135 - 1.9112.) / 1.9112 = 0.12% less than the -1.9135 value measured using deuterium's positive charge as the neutron carrier because deuterium has 2.224 MeV less mass than a proton and neutron and a $(m_n + m_p) / (m_n + m_p - 2.224) = 1877.8379 /1875.6139 = 0.12\%$ mass loss results in the higher -1.9135 measured value.

A neutron's ½-spin is similarly explained. Normally an orbital angular moment is spin 1 but independent observers see the neutron's orbital electron surface with the 2.76136 fm radius contracted to 1.091 fm so its moment is offset (2.76136 - 1.091) / 2.76136 = 60.5% toward observers. This is the cos of a 52.77º spin moment and within 4% of the $\cos^{-1} 3^{½}$ = 54.74º ½-spin value. However the 1.091 fm neutron orbital radius and 1.0355 fm proton radius have a 0.0555 fm separation so the proton also accelerates toward the electron charge through a time dilated field as the electron orbits to the proton's far side, yielding an average $2^{½}$ x 0.0555 fm = 0.07849 fm motion away from the electron and its (2.76 - 1.091) = 1.67 fm spatial contraction. This 0.07849 fm motion is reduced by a 2.531 $m_e$ / 1836 $m_e$ = 0.13785% electron to proton mass ratio times the 1.0355 fm proton radius to a 0.0014275 fm gyration about its center. So the spin 1 actually displaces by (2.76136 - 1.091 + 0.0014275) / 2.76136 = 57.7%, the $\cos^{-1}$ of 54.76º and within 0.04% of the 54.74º ½-spin moment.

The mass, 0 charge, ½-spin and -1.9135 magneton neutron characteristics are thus explained by a Bohr hydrogen atom model with a 0.78233 MeV electron. The only remaining unexplained characteristic is the electron anti-neutrino released when a neutron decays into a proton, electron and 0.78233 MeV. Since angular momentum must be conserved on decay and the 2.531 contraction affects that momentum it to must be conserved. A neutron's 3-dimensional 0.78233 MeV energy decays to a 2-dimensional Bohr orbital ground state with -13.605698 eV coulomb and angular momentum energies so the energies and orbital radius have a (0.78233 MeV / 3) / 13.605698 eV = 19166.75 ratio (i.e. 0.52917725 x $10^{-10}$ m / 19166.75 = 2.760913 fm, within 0.016% of the calculated 2.76136 fm radius).

The 1-d -13.6057 eV kinetic and coulomb energies yield a $(2 \times 13.6057^2)^{½}$ = 19.24 eV 2-d resultant orbital energy. However if the 19.24 eV were still a 3-d resultant its 1-d components would be $19.24^{1/3}$ = 2.6796 eV compounded by the 2.531 relativistic contraction energy to 6.78 eV. This 3-d component is released on decay and manifests as a 6.78 eV ½-spin electron anti-neutrino, since the 2.531 relativistic contraction is the effect that transforms a spin 1 to ½-spin, so the 0.78233 MeV releases as kinetic energy while the 3-d and spatial contraction energies conserve as a neutrino.

While this model may not be absolutely correct it does explain all known neutron characteristics in terms of classical electromagnetic and relativistic principles. Since no other theory exists to explain any characteristics of a neutron there is substantial evidence to support our contention that a neutron is a 0.78233 MeV quantum state of hydrogen and no evidence to dispute it. It should also be noted that Heisenberg's Uncertainty Principle states that it is fundamentally impossible to simultaneously measure a particle's position and momentum with infinite accuracy since position and momentum measurements can't be less than ½ h/2pi, or ½ of the photon wavelength used to measure them, but there are corollaries to the Uncertainty Principle.

Heisenberg's Uncertainty is an undisputed statement of logic that no line of reasoning has effectively challenged. However it only applies to an observer's measurements and not to actual particle interactions, as Yukawa's Theory on mesons shows where the dE·dt = ½h/2pi energy-space-time relation becomes a Certainty Principle that predicts particle formation. Corollaries to the Principle are: 1) Resolution error decreases with observer to particle distance; 2) Resolution error decreases as mass to velocity ratio increases; and 3) Planck's Constant transforms from a quantum energy-time domain to a relative and continuous force-space-time domain as resolution error decreases.

So as distance decreases or mass increases, resolution increases and h becomes a force-space-time relation, which is why star and planet movements are predictable by continuous force-space-time relations but particle motions are only predictable in terms of probabilities and quantum energies. So if we change position to that of a small particle such as an electron in a region of larger low-momentum particles like protons, electron behavior can be predicted by continuous force-space-time relations such as a Bohr analysis of a hydrogen atom, neutron and other structures like deuterium, tritium and helium-3 and 4.

Since this analysis yields the exact nuclear binding and magneton values for H-2, H-3, He-3 and He-4 n-p helion-triton structures it substantiates that the neutron is a 0.78233 MeV hydrogen atom and agrees with Schroedinger's wave function since a high energy orbital electron is a wave function with a radial probability density confined to a narrow region around a proton that reduces to a Bohr solution. As with ionic bonding, a presence of more than one proton merely results in a deeper energy well, but with coulomb forces amplified by the electron's relativistic spatial contraction, so nuclear binding is simply relativistically enhanced ionic bonding and predictable by Bohr analysis.

If a neutron and proton approach within 2.76 fm of each other, then energy has to be added to overcome an $F = k_e e^2 / r^2$ coulomb repulsion between the neutron proton and reactant proton, reduced by electron shielding, until a separation of 1 fm is reached. The added energy plus a binding energy is released as the separation contracts to 0.4 fm. Binding occurs by electron resonance between the protons, like resonance binding in benzene, and the 1 - 0.4 fm contraction occurs from a 2.531 mass increase from coulomb energy absorbed by the electron from the reactant proton. The E = Fd binding energy occurs by contraction of the average force between the protons at 1 fm and 0.4 fm, so B.E. = ½(0.6 fm) $(F_{O.4} – F_1)$ = (0.3 fm)$k_e e^2$(1/0.4 $fm^2$ – 1/1 $fm^2$) = (0.3 fm)(1442 - 231 = 1211 N) = 3.633 x $10^{13}$ J = 2.268 MeV, within 2% of deuterium's actual 2.224 MeV.

Specifically a 0.78233 MeV neutron orbital electron sees itself 2.76136 fm from the neutron center but a reactant proton sees it as $r_n$ = 1.091 fm from the center because of its 2.531 orbital contraction. So when a proton with an $r_p$ = 1.03 fm radius is 2.76 fm from a neutron, its center will be (2.76 + $r_p$) = 3.79 fm from the electron and (2.76 + $r_n$ + $r_p$) = 4.88 fm from the neutron's center, which means the proton has a $E_a = k_e e^2$/3.79 fm = 0.38 MeV attraction energy for the electron and a $E_r = k_e e^2$ /4.88 fm = 0.30 MeV repulsion for the neutron's proton, or a net (0.38 - 0.30) = 0.08 MeV attraction.

This means a reactant proton would feel a small attraction for a neutron at 2.76 fm but it actually has no net force because electron motion attenuates the attraction so 2.76 fm is the initial interaction distance. As the proton approaches to 1 fm from the neutron its center is (1 + $r_n$ + $r_p$) = 3.12 fm from the neutron with an $E_r = k_e e^2$ /3.12 fm = 0.46 MeV repulsion, except a 1 fm gap is less than the 1.03 fm proton radius and the electron's (1 + 1.03) = 2.03 fm distance to its center is less than the 2.76136 fm to the neutron center. In 1961 Hofstadter (SLAC) showed that protons have a surface charge, which means that within a radial distance energy calculations must be to the surface, not center, so at 1 fm the electron will absorb $E_a = k_e e^2$ /1 fm = 1.4402 MeV, which added to its 0.78233 MeV neutron state energy gives it a 2.2225 MeV energy.

This is within 0.07% of deuterium's 2.224 MeV binding energy and gives the electron 3 energy components, 0.78233 MeV towards its neutron proton, an equal energy toward the reactant proton, and a (1.4402 - 0.78233) = 0.658 MeV resonance energy. Because the electron is 2.76136 fm from its neutron center and $(2.76136 - r_p)$ = 1.72586 fm from its proton surface, which is greater than $r_p$, this $(m_e + 0.78233)/m_e$ = 2.531 mass increase vector contracts the entire 2.76 fm to the observed 1.091 fm neutron radius. And because the electron is 1 fm from the reactant proton's surface, within the $r_p$ radial distance to its surface, this 0.78233 MeV 2.531 mass increase vector only contracts the 1 fm gap to 1 fm/2.531 = 0.3951 fm, the observed 0.4 fm binding gap.

Because of its neutron orbital motion the electron moves tangentially to the 1 fm proton, with 0.78233 MeV vectors toward each proton and a 0.658 MeV resonance energy orthogonal to their axis. Since its angular momentum must be conserved the equal and opposite 0.78233 MeV vectors shift the orbital moment to between the protons, like a molecular hybrid orbital held in equilibrium by their charges. The electron is 1.72586 fm from the neutron proton surface and 1 fm from the reactant proton surface so it has a 0.72586 fm transition region between the protons for an electron resonance orbital 2.76136 fm from a proton center and 1 fm from a proton surface, alternating neutron states. Observers only see a 1.091 fm neutron and 0.4 fm bond by the 2.531 spatial contractions.

Since the neutron's 0.78233 MeV has equal electric, magnetic and kinetic energies its angular momentum is 0.78233 MeV/3 = 0.260777 MeV, which compounds by the 2.531 relativistic contraction to the 2.531 x 0.78233 MeV = 0.660 MeV resonance orbital energy that adds to the 0.78233 MeV energy vectors to yield deuterium's 2.224 MeV B.E., conserving angular momentum. Momentum vectors in an orbital cancel so the electron's 2.224 MeV is not apparent to observers and represents a mass loss that must be added to deuterium to break its bond. To observers this is the energy released by the 1-0.4 fm proton gap contraction, since their charges decelerate them in an acceleration field they lose mass just as the electron gains mass accelerating toward their charges. Energy is conserved since the electron gains the 2.224 MeV the proton and neutron loses and space is contacts 0.6 fm as it releases 2.224 MeV to surrounding space.

It may be noted that contraction of the neutron's 2.76136 fm orbital to its observed 1.091 fm radius leaves a 0.0555 fm gap between the electron and 1.0355 fm radius proton. The $(2.76136 - r_p)$ = 1.72586 fm space contracts to 0.0555 fm and its 1 and 0.72586 fm regions contract to 0.03216 and 0.02344 fm respectively. The (0.72586 - 0.02344) = 0.70242 fm contraction to the 0.72586 fm region is 99.386% of Yukawa's d = ½hc/2piE = 0.70676 fm 139.6 MeV pion$^{+}$/- distance so only a small bond compression is required to produce a pion.

The (0.78233 + 0.658) = 1.4402 MeV absorbed from a 1 fm reactant proton causes a $m_e/(m_e$ + 1.4402) = 0.26189 contraction to the 0.72586 fm resonance orbital so its 0.72586 fm/2 = 0.3629 fm radius contracts to 0.2619 x 0.3629 fm = 0.0950 fm for each electron transition from a neutron state with one proton to the other. This is a peak value with a 0.0950 fm/$2^{½}$ = 0.06721 fm average contraction that reduces the neutron orbital to (2.76136 - 0.06721) = 2.69415 fm, contracted to 2.69415 fm/2.531 = 1.06446 by the 0.78233 MeV neutron energy and represents an added 1.06446 fm/1.091 fm = 0.975675 contraction effect on the deuterium magneton, reducing the neutron and proton magneton sum to a net (2.7928-1.9135) x 0.975675 = 0.8579, within 0.06% of deuterium's 0.8574 value.

H-3, He-3 and He-4's B.E.'s are similarly derived and generally defined by the B.E. = $3^{1/d}(p \times 2.2147)^n$ geometric relation in terms of a 1-d deuterium bond, where 3 is available spatial dimensions, lid is structural dimensions (2 for H-3 and He-3, 3 for He-4), p and n are the number of protons and neutrons, and 2.2147 MeV is H-2's 2.224 MeV B.E. reduced by 0.42% to adjust for orbital resonance distortions from multiple dimensions. Calculated binding energies are 8.495 MeV, 7.672 MeV and Z8.296 MeV for H-3, He-3 and He-4 respectively, within 0.6% of their actual 8.482 MeV, 7.718 MeV and 28.297 MeV values. Their magnetons are calculated similarly to H-2's, by summing individual component values and compounding them with the orbital relativistic effects.

A 0.78233 MeV quantum neutron hydrogen atom model effectively calculates and explains all neutron characteristics and H-2, H-3, He-3 and He-4's B.E.'s, magnetons and spins, strongly substantiating its correctness, while no other model or theory explains any of these phenomena. Most importantly, it reduces nuclear binding to established electromagnetic and relativistic principles. Based on the concepts developed in the theory, synthesis of neutrons is merely a matter of exciting hydrogen atom electrons to 0.78233 MeV energy states. Feasibility models were constructed and neutrons were synthesized on July 12, 2003. Neutrons were then reacted to form He-4 nuclei with the release of 14 MeV beta particles. Neutron synthesis requires only 0.783 MeV each, with four needed per He-4 nucleus, which releases 28 MeV for a net 8 to 1 energy gain.

A fundamental process requirement is that particle energies be kept low so as to prevent relativistic spatial distortions that disrupt interactions, like enzyme or catalytic stereochemical versus high energy thermal reactions. In order to accomplish this protons were accelerated in a Cyclotron to 0.783 MeV and electrons were accelerated in an electron gun to 426 eV, since 426 eV x $m_p/m_e$ = 0.783 MeV, to give them the same relative velocities. The electron and proton beams were then directed in parallel into a reaction chamber where a deflector plates guided the electron beam tangentially into the proton beam at an angle simulating the electron angle of incidence in an He-3 nucleus.

This way a proton transfers 0.78233 MeV to an electron as it accelerates toward the charge but enters an orbital because of the tangential motion. A strong gravitational field can contract a hydrogen atom into a neutron orbital state but inertial energies directed by coulomb forces have the same effect at much lower energies. The electrons cannot absorb more than 0.78233 MeV since it results in a 2.76 fm orbital contracted to 1.091 fm, only 0.0555 fm above the proton's surface. The electron absorbs the proton inertial energy through its charge field and transforms it into a neutron electron's angular momentum by radial coulomb force and spatial contraction. Angular momentum is created and conserved by spatial contraction and released as a neutrino on decay.

Generated neutrons are "slow" because proton inertial energy transforms into electron orbital energy and when concentrations are sufficient they align in pairs with opposing magnetons. And with ½-spin magnetons that gyrate below 45°, pairs orthogonally align to equally distribute magnetic energy in 3-d. This is not prohibited by Pauli's Exclusion, it is caused by it. Neutrons are single electron atoms that can have any orientation, but unbalanced magnetons align to achieve equilibrium like monatomic hydrogen. Tetrahedral orthogonal pairs configure neutron orbital electrons in unique quantum energy states like carbon atom $sp^3$ orbitals 109.47° apart, with the neutron protons at 109.47°/2 = 54.74° tetrahedral nodes, matching neutron ½-spin $\cos^{-1} 3^{-1/2}$ = 54.74° angles.

In this configuration neutron orbital electron charges synchronize them in a p:e:p:e == e:p:e:p resonance so one electron is between protons while one is outside. As an inside electron passes 1 fm from a proton it absorbs energy and contracts the 1 fm to 0.4 fm while the outside electron 2.76 fm from the center is emitted as the force holding it weakens because the proton was moved 0.6 fm away. Since this happens to both pairs two β particles are emitted and the remaining 2 electrons bond the 4 protons into a tetrahedral He-4 nucleus. It is well known that neutrons form alpha particles and this is the mechanism based on the 0.78233 MeV quantum neutron hydrogen atom model.

We appreciate the time and effort taken by you and your staff to review our process and hope the enclosed information answers your questions. However we are seeking assistance in another way. As mentioned we have 2 feasibility units and know the process works. We are constructing a demonstration unit and have designs for 100 KW and 300 MW units. While our primary interest is business, we are also interested in eliminating foreign oil dependence and the 70 billion pounds of $CO_2$ released each day from world oil consumption, we are interested in eliminating our import oil trade deficit, and we are interested in revitalizing productivity in energy dependent materials manufacturing area like steel, aluminum, glass, concrete and chemicals.

The technical obstacles in manufacturing fusion power units are merely matter of engineering but logistics of nationwide implementation pose almost insurmountable obstacles in the areas of regulatory approval and overcoming vested special interest influences. America consumes 25% of world energy and it would be good business and beneficial to all concerned to do our initial implementation in this country. However without DoE assistance in these areas such an implementation may not be feasible. The process produces no gamma radiation since the nuclear bonding orbitals are never excited above their initial formation energy. The reaction is self-quenching so there is no fail safe problem or other radioactive products. The 100 KW units are intended primarily for automotive applications but energy from the 300 MW units could be used for hydrogen production or coal gasification.

Thank you for your time and effort in this matter.

Sincerely,

W. T. Gray