Method of controlling a chemically-induced nuclear reaction in metal nanoparticles

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A nuclear reaction can occur when metal nanoparticles are exposed to hydrogen isotopes in the gas phase. When hydrogen isotopes (light hydrogen and deuterium) enter the nanoparticles and are exposed to electron irradiation, the hydrogen reacts inside the lattice producing energy. The reaction also produces neutrons, gamma rays and transmutations. Normally, electron irradiation does not produce anomalous heat or radiation. A reaction occurs when hydrogen acts as a heavy fermion (a heavy electron) inside metal nanoparticles below a certain particle size, allowing the hydrogen isotopes to approach one another closely.

Usually, with deuterium, to cause a fusion reaction it is necessary to supply energy of 10^7 K, or 1 keV per atom. With light hydrogen it is necessary to supply 1.5×10^7 K, for a reaction rate of 10^{-31}. With a reactor system on a scale smaller than the sun, a significant fusion reaction does not occur. However, when heavy electrons enter the outer shell of a proton, the radius of the hydrogen atom becomes exponentially smaller with respect to the weight of the heavy electrons, bringing the protons closer together. When this happens, the probability of tunneling fusion increases exponentially.

The nuclear reaction can be controlled with this energy production method of bringing protons and heavy electrons together inside nanoparticles. This brings within reach the goal of developing a practical nanoparticle energy reactor.