Is the Holmlid Effect Real? Any Independent Replications? Laser Pulses Focused on D_2 inside a TiD_2 Pinhole Might Form a Holmlid Effect Heating Device.

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Laboratories in Sweden (Holmlid et al), Iceland (Olafsson), and Norway (Zeiner-Gundersen) have observed the formation of charged particles in the MeV range, when low pressure D_2 close to a dehydrogenation catalyst (potassium-promoted FeO, platinum or palladium) was exposed to the blow-away of electrons by focused pulses (200 mJ, 5 nsec, 10 Hz) from a Neodynium-YAG laser at 532 nm. Based on the formulas for "Coulomb explosions" Holmlid [1,2] deduces a separation of deuterium atoms of 2.3 picometer and proposes a special D(0) state where several D's are separated by 2.3 picometer or 1/30th of the separation in a D_2 molecule.

D's so close together should fuse immediately [3], so I have great difficulties with the "D(0) state". This state also requires that an electron "sits still" permanently between deuterons to prevent electrostatic repulsion blow the assembly apart.

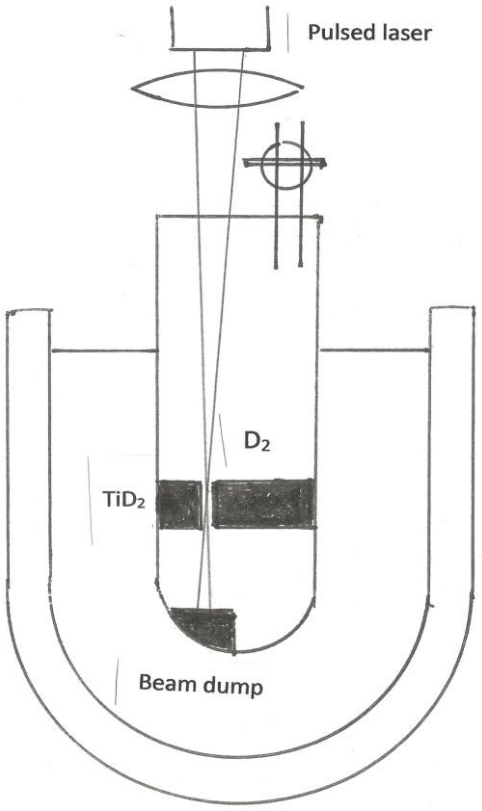
However, the important thing is: is the Holmlid effect real??

Holmlid and associates have published about 50 papers [4,5], describing deuterons, deuteron clusters [2,4], muons [6], and neutrons [7], as well as direct heating [8]. According to Google scholar and ResearchGate the papers are widely read, but nobody outside the loop seems to have replicated the results.

Direct replication requires sophisticated equipment, a time-of-flight mass-spectrometer connected to a special custom-made vacuum chamber.

Perhaps simpler equipment could be used:

1) A vacuum-chamber with low pressure D_2, dehydrogenation catalyst, YAG laser, focusing lens, laser beam dump, and an alpha ray detector inside the chamber, not sensitive to beta or gamma rays, e.g. CR-39 plastic, perhaps with appropriate shielding.



2) A Holmlid effect heating device, consisting of a large pyrex tube capped with a transparent window and evacuation stub, a plug with a 0.5 mm pinhole lined with titanium deuteride, a laser beam dump, with deuterium at low/medium pressure. The tube is inserted in water in a dewar, and YAG laser pulses are focused through the pinhole [9], - touching would cause laser ablation. Titanium deuteride is a good target for deuterium fusion [10,11]. Is there excess heating beyond the one watt laser effect?

Perhaps, there might be other models than the D(0) state. Perhaps the D^+ ions get accelerated by naked Fe nuclei generated by the laser pulses. Perhaps a D^+ might pass in between the 3 D's in a D_3^+ ion entering into an Efimov type reaction with the end result:

$$D+D+D \rightarrow ({}^{D}_{D}{}^{D}) \rightarrow He + D\ (24\ MeV)$$

Efimov interactions between 3 bosons have a much larger range than the interaction between two bosons [12-14]

If the Holmlid effect is real, the scientific community may have been sitting on a solution to the world's energy problems for almost 15 years.

Perhaps, the Holmlid effect is a special case of the well-known table-top laser induced deuterium cluster fusion [15-16]. Differences are that the Ditmire laser operates with an effect of $> 10^{16}$ Watt/cm^2 in the laser focus, the Holmlid commercial laser at 10^{12} Watt/cm^2; the Ditmire deuterium clusters are produced at very low temperatures, Holmlid's system operates with heating.

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