Ultradense hydrogen matter

Jos Engelen

29-12-2021

By chance my eye fell on a publication on energy production by particle-antiparticle annihilation in ultradense hydrogen [1], published by the International Journal of Hydrogen Energy. The title 'Energy production by laser-induced annihilation in ultradense hydrogen H(0)' immedeately catches the eye. It looks more like science fiction than a publication in a peer reviewed scientific journal. (I think it is science fiction).

The paper contains 33 references, of which 25 are to other papers by the same author. Of these 25 there are 2 crucial references to as yet unpublished papers and thus cannot be consulted. A number of references (with 'clickable' hyperlinks) are included in the present note.

A central theme is ultradense hydrogen with a distance between the protons of 2 pm, 2 10^{-12} m. The distance between the protons in ordinary hydrogen is of the order of 0.1 nm, 10^{-10} m. So the density of ultradense hydrogen is 10.5 kg/cm^3, $50^3 = 125\ 000$ larger than that of ordinary hydrogen (0.084 g/cm^3).

In [3] it even reads 'this type of matter has a density of many hundred kg/cm^3 since the interatomic distances are down to 0.57 pm.'

I have found no independent confirmation of the creation of this remarkable state of matter in the literature. The closest I got is a recent review [4]. No evidence on ultra-dense hydrogen is presented in this review. Note that ultra-dense hydrogen is not identical to (hydrogen) Rydberg matter (RM). I quote the last sentence of the abstract of [4]: 'And as there is little knowledge on the exact mechanisms for RM formation, suggestions are given as to where research should start.'

Note that all the references in the present note are to publications in respectable journals or on respectable platforms. One of the journals retracted a publication [15].

What should be my conclusion on the results published on ultradense hydrogen? Fabricated results? Or 'just' overstated conclusions? Delusion? Independent replication of this research should be published! There certainly are (negative?) results 'out there'. Publish them!

References

[1] L. Holmlid, "Energy production by laser-induced annihilation in ultradense hydrogen H(0)," Int. J. of Hydrogen Energy **46** (2021) 14592-14595. https://www.sciencedirect.com/science/article/pii/S0360319921004080

[2] L. Holmlid, "Controlling the process of muon formation for muon-catalyzed fusion: method of non-destructive average muon sign detection," EPJ Tech. Instrum. **8** (2021) no.1, 15 https://doi.org/10.1140/epjti/s40485-021-00072-9

[3] L. Holmlid and S. Olafsson, "Laser-induced annihilation: Relativistic particles from ultra-dense hydrogen H(0)," High Energy Dens. Phys. **40** (2021), 100942 https://doi.org/10.1016/j.hedp.2021.100942

[4] Tor Håvard Aasen, Dag Herman Zeiner-Gundersen, Sindre Zeiner-Gundersen, Per Ohlckers, Kaiying Wang, 'A Condensed Excited (Rydberg) Matter: Perspective and Applications', Journal of Cluster Science (2021). https://doi.org/10.1007/s10876-021-02031-6

[5] L. Holmlid, "Ultra-dense hydrogen H(0) as dark matter in the universe: new possibilities for the cosmological red-shift and the cosmic microwave background radiation," Astrophys. Space Sci. **364** (2019) no.8, 141 https://doi.org/10.1007/s10509-019-3632-y

[6] L. Holmlid and S. Zeiner-Gundersen, "Ultradense protium p(0) and deuterium D(0) and their relation to ordinary Rydberg matter: a review," Phys. Scripta **94** (2019) no.7, 075005 https://doi.org/10.1088/1402-4896/ab1276

[7] L. Holmlid, "Ultradense Hydrogen H(0) as Stable Dark Matter in the Universe: Extended Red Emission Spectra Agree with Rotational Transitions in H(0)," Astrophys. J. **866** (2018) no.2, 107 https://doi.org/10.3847/1538-4357/aadda1

[8] L. Holmlid, "Leptons from decay of mesons in the laser-induced particle pulse from ultra-dense protium p(0)," Int. J. Mod. Phys. E **25** (2016) no.10, 1650085 https://doi.org/10.1142/S0218301316500853

[9] L. Holmlid, "Nuclear particle decay in a multi-MeV beam ejected by pulsed-laser impact on ultra-dense hydrogen H(0)," Int. J. Mod. Phys. E **24** (2015) no.11, 1550080 https://doi.org/10.1142/S0218301315500809

[10] L. Holmlid, "Neutral multi-MeV/u particles from laser-induced processes in ultra-dense deuterium D(0): accurate two-collector timing and magnetic analysis," https://arxiv.org/ftp/arxiv/papers/1508/1508.01332.pdf

[11] L. Holmlid and S. Olafsson, "Muon detection studied by pulse-height energy analysis: Novel converter arrangements," Rev. Sci. Instrum. **86** (2015), 083306 https://doi.org/10.1063/1.4928109

[12] L. Holmlid, "MeV particles in a decay chain process from laser-induced processes in ultra-dense deuterium D(0)," Int. J. Mod. Phys. E **24** (2015) no.04, 1550026 https://doi.org/10.1142/S0218301315500263

[13] F. Olofson and L. Holmlid, "Intense ionizing radiation from laser-induced processes in ultra-dense deuterium D(-1)," Int. J. Mod. Phys. E **23** (2014) no.09, 1450050 https://doi.org/10.1142/S0218301314500505

[14] L. Holmlid, "Direct observation of particles with energy >10 MeV/u from laser-induced fusion in ultra-dense deuterium," Laser Part. Beams **31** (2013), 715-722 https://doi.org/10.1017/S0263034613000414 [arXiv:1302.2781 [physics.ins-det]].

[15] L. Holmlid, Mesons from laser-induced processes in ultra-dense hydrogen H(0). PLOS ONE 12 (2017) e0169895. https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0169895 Retracted by the journal.