The Dark Matter Solution: Liquid, Metallic, H(n=29)

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Based on: ***The Dark Matter Solution: Resizing Rydberg*** **(Brink, 2020)**

Abstract

Dark Matter is identified as a highly expanded form of hydrogen, most likely liquid, metallic H(n=29), that is the newly defined galactic interstellar 'very cold neutral medium', VCNM and the source of Cosmic Microwave Background radiation. Identification has been enabled via a recognition that there is adequate baryonic mass in the interstellar medium to account for the missing mass attributed to dark matter and confirmed via spectral matching, based on a modification to the Rydberg atomic hydrogen size state relationship. These findings have significant broad implications for astrophysics including for the Big Bang Universe origin theory.

In 2020, *The Dark Matter Solution: Resizing Rydberg* (Brink, 2020) began to significantly redefine modern physics by identifying dark matter as highly expanded hydrogen and the source of Cosmic Microwave Background radiation.

This paper again presents material from the 2020 paper, but also extends on these ideas and presents new analysis on the likely hydrogen state and the structure of dark matter.

In early 2020, as the globe was plunging into the depths of the COVID-19 epidemic, the dark matter solution emerged. The search for the 'missing mass' of dark matter had been an obsession for many since its proposal in around 1933 by Fritz Zwicky. Here in Australia, the relocated Great Melbourne Telescope joined the MaCHO project in the 1990s and searched the skies for dark matter as massive compact halo objects with limited success. More recent experimental efforts were focusing on looking for evidence of exotic Weakly Interacting Massive Particles (WIMPs). A number of independent researchers had been getting closer to the eventual answer by investigating the idea that interstellar hydrogen could make up the 'missing mass' either as undetectable forms of contracted hydrogen, H(n<1), (Mills, 2008), cold H1 atomic hydrogen in an anti-parallel lower energy state, (Tatum, 2020), or as expanded forms of 'Rydberg' forms of H(0) ultra-dense hydrogen, (Holmlid, 2019 A).

As the solution emerged, the answer was elegantly simple, but quite astonishing. Dark matter was simply the interstellar medium and more amazingly it was already observable!!! To date galactic mass calculations had not included the mass of the interstellar medium (at around 0.15 atoms per cm^3), missing the simple conclusion that there was enough baryonic mass in the intergalactic medium to account for the 'missing mass' of dark matter. The astrophysics community had also failed to realise that perhaps our most studied astronomic signal, Cosmic Microwave Background radiation, could be explained by the interstellar medium, instead adopting the far (in time) fetched view that this radiation has its origin over 12 billion years ago in the early Universe, despite obvious correlations between the spatial distribution of the spectrum and the distribution of matter (observable and dark) in the Milky Way and other local galaxies.

The implications were undoubtedly highly significant.

So what happened in the lead up to 2020 to allow this discovery? The simple answer was "Rydberg had been resized", (Brink, 2018). It was now recognised that atomic hydrogen state sizes are exponentially related, with each subsequent higher energy state being twice the size of the previous state, rather than a power of two relationship (e.g. Bohr model).

At the heart of this development was a fundamental shift in our understanding of the atomic electron. The electron was no longer being described as a point orbiting the nucleus (Bohr model), but was now recognised as the electromagnetic field itself (Mills, 2008). Quantised energy changes between Rydberg states were subsequently identified as being consistent with electromagnetic field curvature changes, but only when based on an exponential state size model (Brink, 2018). Exponential state sizes were also consistent with the experimentally observed size relationships of various ultra-dense hydrogen states (Holmlid, 2019 B) and emerging ideas of spacetime as an extremely rigid medium with acoustic-like resonance properties (Macken, 2015).

The new size state model was then applied to the interstellar medium. It was quickly recognised that the new hydrogen state size relationship could potentially describe the density of the interstellar medium, not as a chaotic vacuum of sparsely separated "normal" ground state molecular or atomic hydrogen, but as "filled" orderly structure of highly expanded hydrogen.

Calculations using the new Rydberg size state model identified that highly expanded hydrogen, with a state around H(n=28) to H(n=30), depending on structure, would have equivalent density to the interstellar medium of the Milky Way galaxy dark matter halo (~700,000 to 800,000 light years in diameter).

Importantly the modified Rydberg dark matter solution could predict the expected emission spectrum from highly expanded atomic hydrogen states. When the emission spectrum was calculated, amazingly the first state transition energies H(n=j) -> H(n=j+1) closely matched the peak of the Cosmic Microwave Background radiation emission spectrum!!!

The first excitation energies of potential dark matter highly expanded hydrogen states and the Cosmic Microwave Background radiation peaks are listed below demonstrating a close match.

H(n=29) -> H(n=28) - 284 GHz
H(n=30) -> H(n=29) - 256 GHz
H(n=31) -> H(n=30) - 232 GHz
Cosmic Microwave Background spectral radiance peak (dE_v/dv) – 160 GHz
Cosmic Microwave Background peak $(dE_\gamma/d\gamma)$ – 282 GHz

The full spectrum comparison is shown in Figure 1 below.

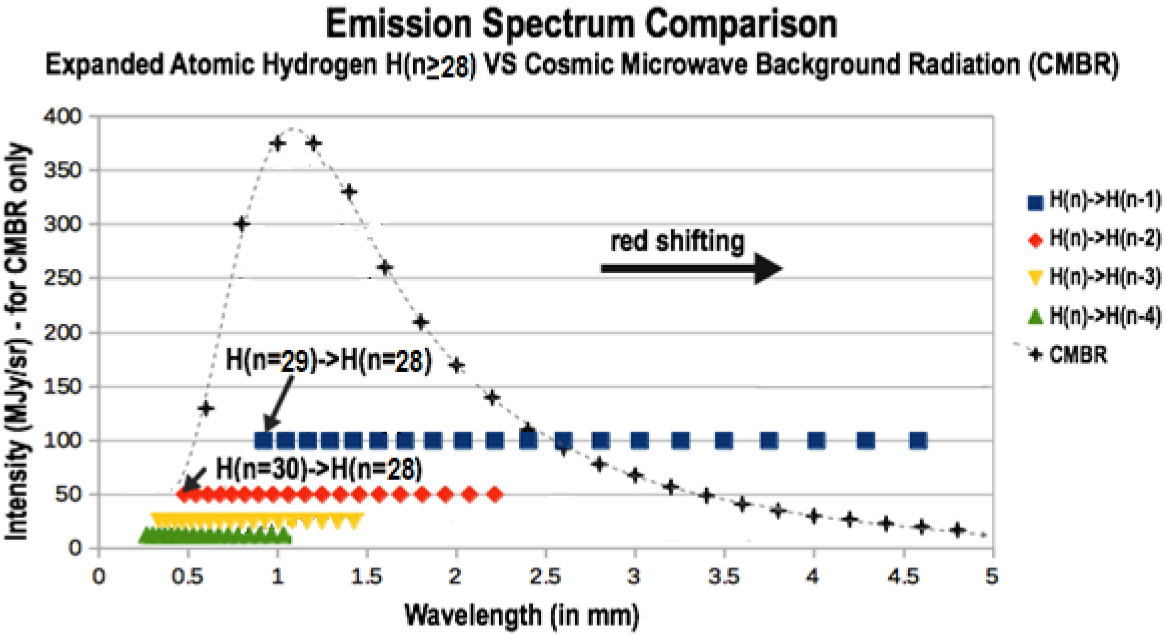

Figure 1 – Comparison of the Emission Spectra for Highly Expanded Atomic Hydrogen States and Cosmic Microwave Background Radiation

So, what is the significance of this match? At a first glance there may be no significance as discrete atomic state transitions energies are very different from broad spectrum continuous blackbody radiation curves (such as the 0.1 to 1000 GHz spectrum of the Cosmic Microwave Background) which vary only with temperature.

However the match is of significance if it is realised that the Cosmic Microwave Background spectrum could provide the necessary matching transition energies to stimulate expanded atomic hydrogen states to transition to higher energy states, via H(n=j) -> H(n=j+1) for atomic hydrogen states above ~H(n=7). Under very low pressure and temperature conditions, such as in outer space, successive transitions may be able to proceed without decay back to lower energy states.

A potential link between hydrogen and Cosmic Microwave Background radiation was also supported by reported Cosmic Microwave Background radiation observations during ultra-dense hydrogen H(0) experiments, (Holmlid, 2019 A).

The proposed model is that atomic hydrogen states transition via H(n=j) -> H(n=j+1), triggered by Cosmic Microwave Background radiation, until eventually a more stable state is formed (dark matter) with a calculated average density equivalent to hydrogen states around H(n=28) to H(n=30), depending on structure.

The following potential structures are identified which match the calculated galactic dark matter density:

- Liquid or solid: $H_{1 \text{ or } 2}$(n=28), with an equivalent structure to H_2(n=1) liquid hydrogen,
- Liquid or solid, metallic, H(n=29),
- Solid, tightly packed lattice, H(n=30).

As dark matter does not emit discrete spectral bands (and emits blackbody radiation), it is considered more likely that dark matter is liquid, rather than gaseous. A solid state is considered unlikely due to minimal evidence of “solid” behavior of the interstellar medium with respect to the movement of objects.

As such, one of the following two states/structures is now considered more likely:

- Liquid, with an equivalent structure to H_2(n=1) liquid hydrogen: $H_{1 \text{ or } 2}$(n=28).
- Liquid metallic, H(n=29).

It is unclear whether dark matter is best described as hydrogen in a single state or a distribution across multiple states, however typical known liquid behaviors and the calculated relatively uniform density of the galactic dark matter halo would tend to suggest a single state solution is a reasonable first approximation.

Given increasing recent evidence for the electrical conductivity of outer space, such as the ‘heliospheric current sheet’ which carries around 3×10^9 amps through our own solar system and an equivalent galactic system carrying 10^{17} to 10^{19} amps (source: electricuniverse.info), a conductive liquid metallic structure, i.e. H(n=29) would appear to be most consistent with the know properties of the galactic medium.

As the Cosmic Microwave Background Radiation spectrum matches blackbody radiation at a temperature around 2.7 degrees K, this is also expected to be the average temperature of dark matter. As such, consistent with existing interstellar medium terminology, this medium could potentially be referred to as the ‘very cold neutral medium’, VCNM.

Identification of a dark matter solution and the proposed modification to the Rydberg size state relationship in general have additional broad implications for astrophysics at a wide range of scales. This particularly includes implications for the Big Bang Universe origin theory, as this discovery directly opposes the currently accepted explanation for the Cosmic Microwave Background as remnant radiation from a Big Bang Universe origin event.

In summary, dark matter is identified as highly expanded hydrogen, most likely in liquid, metallic form, equivalent to H(n=29), that can be referred to as the galactic interstellar very cold neutral medium, VCNM and emits the Cosmic Microwave Background radiation signature.

Dark matter is not observationally dark, we just didn't realise we were already observing it!!!

References:

Brink, S. 2016-2020, *Dark Matter Webpage,* available at: subtleatomics.com/dark-matter

Brink, S. 2018. *LENR Catalyst Identification Model*, presentation at ICCF-21, slides available at:
Brink, S. 2018. *Low Energy Nuclear Reaction Catalyst Identification Model*, self-published, available at: subtleatomics.com/dense-atomic-h-catalysts

Brink, S. 2020, The Dark Matter Solution: Resizing Rydberg, *Infinite Energy Magazine*, Issue 155, Jan-Feb 2021, Revision 13.1. First released 13th May 2020, available from April 2021 at: https://www.infinite-energy.com/ or draft version available at: https://storage.googleapis.com/wzukusers/user-25079009/documents/7dfbf60e84b3460cb07facc8a4683da6/The%20Dark%20Matter%20Solution-Resizing%20Rydberg-S.%20Brink%20Rev%2013.2.pdf

Holmlid, L. 2019 (A), 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,** 141, Springer Link, open access, accessed 15th May 2020, available at doi.org/10.1007/s10509-019-3632-y

Holmlid, L. & Zeiner-Gundersen, S, 2019 (B), Ultradense protium p(0) and deuterium D(0) and their relation to ordinary Rydberg matter: a review. *Physica Scripta*, open access, accessed 15th May 2020. Available at: iopscience.iop.org/article/10.1088/1402-4896/ab1276

Macken, J. 2015. *The Universe is Only Spacetime, Particles, Fields and Forces Derived from the Simplest Starting Assumption*, Revision 8. Self-published. Available via http://onlyspacetime.com/

Mills, R. 2020, *The Grand Unified Theory of Classical Physics*, self-published, available at: brilliantlightpower.com/book. First published, ~2008.

Tatum, E. 2020, *Dark Matter as Cold Atomic Hydrogen in Its Lower Ground State* [Online First], IntechOPen, DOI: 10.5772.intechopen.com/online-first/dark-matter-as-cold-atomic-hydrogen-in-its-lower-ground-state, accessed 13th May 2020, available at: http://dx.doi.org/10.5772/intechopen.91690

The Electric Universe Theory website, accessed 13/4/21, www.electricuniverse.info